DOCUMENT RESUME

ED 133 929 EC 092 714

AUTHOR Ginn, Mary E.
TITLE Articulation Disorders: A Guide to Program Administration and Case Management for Speech Clinicians in Public Schools.
INSTITUTION South Carolina State Dept. of Education, Columbia. Office of Programs for the Handicapped.
PUB DATE 76
NOTE 87p.

EDRS PRICE MF-$0.83 HC-$4.67 Plus Postage.
DESCRIPTORS *Articulation (Program); *Articulation (Speech); *Educational Accountability; Elementary Secondary Education; Management; Program Administration; Speech Evaluation; *Speech Handicapped; Speech Tests; *Speech Therapists; Student Evaluation

ABSTRACT

Intended to assist speech clinicians in the public schools, the guide provides information on establishing accountability for services to children with articulation disorders. Described are procedures involved in initial screening (such as teacher referral and rapid screening), assessment (including audiometric screening and oral peripheral examination), interpretation of test results (based on such factors as number and type of error), and case selection, scheduling, and dismissal of children with articulation disorders. Among the accountability practices advocated are formulating goals and objectives and using contingency management. Reviewed are five approaches to articulation therapy, including the sensory motor and programed articulation approach. Proposed in the final section is a practical model for program administration and case management. Among four appendixes are lists of articulation screening tests and tests for assessing articulatory proficiency. (CL)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the qualit, *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED133929

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ARTICULATION DISORDERS

A Guide to Program Administration

and

Case Management for Speech Clinicians

in

Public Schools

Mary E. Ginn
Consultant, Speech Handicapped
Office of Programs for the Handicapped

1976

EC092714

CONTENTS

INTRODUCTION v

Unit I. INITIAL SCREENING 1
- Teacher Referral 1
- Screening 2
- Rapid Screening 2

Unit II. ASSESSMENT 5
- Audiometric Screening 5
- Oral Peripheral Examination 6
  - Lip 6
  - Dental Abnormalities 6
  - Tongue 7
  - Hard Palate 7
  - Soft Palate 7
- Language 8
- Articulatory Assessment 8
- Assessment of Other Areas 9

Unit III. INTERPRETATION OF ARTICULATION TEST RESULTS . . . 11
- Number of Errors 11
- Position of Error Sounds 12
- Type of Error 12
- Consistency of Error 14
- Inconsistency of Error 15
- Stimulability 16
- Dialectal Differences 16

Unit IV. CASE SELECTION, SCHEDULING, AND DISMISSAL 19
- Case Selection 19
  - The Waiting List 20
  - Speech Improvement 20
  - Group Therapy 21
  - Individual Therapy 22

Scheduling 22
Itinerant Plan vs. Intensive Cycle Plan 24
Dismissal 25

Unit V. ACCOUNTABILITY PRACTICES RELATED TO CASE MANAGEMENT 27
The Formulation of Goals and Objectives 27
Data Collection and Charting Progress 29
Contingency Management 30
Comprehensive System of Maintaining Records 32

Unit VI. APPROACHES TO ARTICULATION THERAPY 35
Traditional Approach 35
Sensory-Motor Approach 36
Distinctive Features Approach 36
Paired-Stimuli Approach 37
Programmed Articulation 38
SWRL Speech Articulation Kits 38
Modification of the Frontal Lisp Programmed Articulation Kit (S-Pack) 38
Language Master Articulation Therapy Program 39
The Monterey Articulation Program 39

Unit VII. PROGRAM ADMINISTRATION AND CASE MANAGEMENT: A MODEL 41
Initial Identification 41
Notifying Parents 41
Screening 42
Collecting Pertinent Case Information 42
Assessment 42
Audiometric Screening 42
Oral Peripheral Examination 42
Language Screening 43
Articulatory Assessment 43
Reporting the Results of Assessment 44
The Therapy Program 47
Collecting Baseline Data 47
Formulation of Goals and Objectives 47

Using Contingency Management 49
Charting Progress 49
Reporting Progress 54
Summary Reports 54

Appendix A. SCREENING TESTS OF ARTICULATION 55

Appendix B. TESTS FOR ASSESSING ARTICULATORY PROFICIENCY. . 59

Appendix C. TABLES 61

Appendix D. MATERIALS AND EQUIPMENT FOR DIAGNOSIS AND TREATMENT OF ARTICULATION DISORDERS (Available in Learning Resource Center) 65

Bibliography 71

INTRODUCTION

The public school setting is one of the most challenging areas of employment in the profession of speech pathology. The clients served by a speech clinician in public schools represent a diversity of speech and language problems of various etiologies and encompass a wide range of age groups. The standards and procedures approved by the State Board of Education defines speech handicapping conditions as "those impairments which tend to interfere with or limit to varying degrees, the individual's ability to express, formulate, receive or interpret oral language." Speech and language handicaps may be manifested in degrees of mild, moderate or severe and be exhibited as disorders of articulation, voice, rhythm, language, delayed speech and language, and speech/language disorders associated with cleft palate, cerebral palsy conditions, or hearing loss. Speech and language behavior, associated with dialectal differences, may indicate a need for the availability of appropriate services, optional for pupil participation.

Adequate clinical training is a prerequisite to the provision of quality services for speech handicapped children; however, there are many other factors which either contribute to the strength of speech and language programs or limit the effectiveness of these programs in public schools. With the thrust toward "accountability" which has persisted in recent years, speech clinicians in the public schools must be prepared to meet the demands which this concept implies. While accountability has many applications in professional ranks, for educational purposes it may be defined as "the measurable level of learning effectiveness."

In assessing the variables which impinge on the provision of effective services in speech and language programs in public schools, the ASHA—PDME (Program Planning, Development, Management, and Evaluation) task force identified several categories of needs. These needs relate to the following specific areas:

1. The needs of pupils exhibiting speech and/or language disorders.
2. The need for additional trained personnel.
3. The need for improving facilities for speech and language programs.
4. The need for financial resources to expand services.
5. The need for the development of program policies.
6. The need for increased accountability in case management.

In the state of South Carolina, these points have also been expressed as concerns. Formidable strategies have been developed to approach solutions and to seek viable alternatives. The vehicles utilized by the South Carolina Department of Education for transmitting assistance to speech clinicians in public schools have included the following:

1. Conducting conferences conjointly with speech clinicians and their respective district administrators to present administrative considerations essential to strengthening programs.

2. Establishment of funding priorities under Title III and EHA, Part B to include speech and language programs.

3. Development of educational specifications for facilities to house speech and language programs.

4. Initiation of the Monterey Programs in several areas of the state.

5. Providing program audits upon request of district administrators.

6. Participation conjointly with the Office of Teacher Certification in the evaluation of training programs in speech pathology according to competency-based criteria.

7. Presentation of a section on "Speech Handicapped" in the *Administrator's Guide To Public School Programs For Handicapped Children.*

8. Consultation with a Technical Assistance Consultant (TAC) from the American Speech and Hearing Association to examine state laws and State Board regulations regarding speech, language and hearing programs.

9. Monitoring EHA, Part B projects providing speech and language services.

10. Conducting and coordinating conferences designed to provide information relative to specific areas of expertise, to assist clinicians in developing "in-service" programs, and to provide assistance in developing greater accountability as the program grows.

11. Operationalizing definitions to provide more specific guidelines for screening, evaluating, placement and record keeping in speech and language programs in public schools.

The purpose of the present publication is to provide assistance in establishing accountability relative to the initial identification, assessment, interpretation of results, case selection, scheduling, case management and dismissal of pupils with articulatory disorders. The area of articulation was selected from the standpoint that these disorders represent the largest

portion of the caseload of speech clinicians and that this area is generally amenable to the development of definitive, systematic procedures. While many of the facts and concepts presented herein are not innovative, the author has extensively reviewed the professional literature in the field of speech pathology to identify current theoretical constructs and designs which have practical application. Incorporating this information with the understanding of the difficulties surrounding the provision of appropriate speech and language services in the public schools, it is the sincere hope of the author that this publication will be a useful tool.

I would like to express my gratitude to Dr. Gale N. Coston, Associate Vice President for Instruction, University of South Carolina, for his contributions toward the development of this publication.

Unit I

INITIAL SCREENING

The techniques most frequently employed to identify potential candidates for speech and language services as reported by speech clinicians in the South Carolina public schools are:

1. Teacher referral
2. Screening
3. A combination of these two techniques

The combination of screening in kindergarten and elementary schools, and obtaining teacher referrals at the middle school and secondary level appears to be used extensively in the state. With this point in mind, it is interesting to note the information provided by Van Hattum (1972), who elaborates on the studies of Diehl and Stinnet (1956), and a series of studies undertaken in the public schools of Montgomery County, Pennsylvania.

TEACHER REFERRAL

Diehl and Stinnet (1956) examined the abilities of elementary school teachers to make accurate referrals for speech and language services. Similar studies conducted in the Montgomery County public schools investigated the abilities of teachers at the secondary level to make referrals. The results of these studies were closely correlated, and the general conclusions were that the overall percentage of accurate teacher referrals was approximately 40 to 40. 5 percent. This implies that teachers will fail to refer 59.5 to 60 percent of those pupils who are in need of habilitative services for speech and language problems. The probability of obtaining accurate teacher referrals, however, appears to increase as the severity of the problem increases (Van Hattum, 1972).

The interest generated from studies of the nature of those previously cited, led to investigation of whether or not the accuracy of teacher referrals could be improved with training. Van Hattum reported, however, that after extensive training there was no significant improvement in the ability of teachers to identify speech and language defective pupils of mild to moderate severity.

SCREENING

The screening technique has been endorsed by many professionals in the field of speech pathology; namely, Ainsworth (1948), Van Riper (1954), Johnson (1956), and Van Hattum (1959). The present author endorses this technique but recognizes, also, the difficulties of coordinating districtwide screening procedures. The most common rebuttals posed by speech clinicians against utilizing this method of initial identification exclusively are directed toward the following points:

1. Inadequate number of clinicians in relationship to district population.

2. Inability to obtain the support and cooperation of administrators and teachers in scheduling the screening.

3. Delay in initiating therapy programs as a result of the length of time required for districtwide screening.

Each of these points is related to certain "time constraints"; the positive side of conducting a districtwide program of screening, however, is worthy of consideration.

A systematized screening program offers certain advantages that would accrue long-range benefits for the clinician, administrators, and pupils. Once the population of speech and language handicapped pupils is identified, a speech clinician has the hard data required by the administration as support of the need for additional personnel, financial resources or facilities. Obtaining specific information regarding the number of speech and language handicapped pupils in the district would emphasize the need for speech and language services. When all speech and language defective pupils are identified, the speech clinician has a broader base for establishing priorities for services in terms of pupils to be served and the schools which should be served initially. During the first year, the initiation of therapy might be delayed; in subsequent years, however, it would be necessary only to screen grades K-3,new students, and additional teacher referrals, as recommended by "Standards and Procedures" approved by the South Carolina Board of Education. The use of rapid screening techniques and careful consideration of the scheduling procedures would significantly decrease the time factor involved in districtwide screening.

Rapid Screening

In considering the purpose of screening, it is generally agreed that screening provides a means for assessing the general adequacy of a pupil's speech in relationship to his peer group. In the screening process, the clinician is not seeking specific information relative to the etiology, nature or severity of the disorder, as these areas must be explored through assessment procedures. Screening, therefore, should assist the clinician in distinguishing between those pupils who exhibit adequate speech and language proficiency, those pupils who are in need of assessment and those pupils who are immediately detectable as needing speech improvement.

In view of the purpose of screening and in consideration of time constraints, a screening test should be designed for ease of administration and scoring. At the same time, it should provide the clinician with sufficient information to direct the course for planning the battery of tests to be administered in the assessment process. Van Hattum (1972) focuses on a discussion of the length of time adequate for screening purposes; he concluded that two to five minutes is a reasonable allotment of time per child. While the present author supports the concept of rapid screening and from time to time has expounded the virtues of utilizing these procedures, one major problem is encountered. The problem is that, at present, there are few adequate "rapid screening" instruments available.

To be sure, the concept of rapid screening has existed as long as speech clinicians have been employed in public schools. Speech clinicians have recognized the limitations of even the better screening instruments for purposes of 'rapid screening," long before the term was coined. Historically, speech clinicians in the public schools have examined various methods of screening in seeking to find a more efficient means of screening large numbers of children. Speech clinicians have developed individual screening devices based on experience and observations over a period of time; these tests, while satisfying the requirements of being easily administered and scored, have limitations as valid and reliable screening instruments since they have not been standardized.

Included in Appendix A is a list and brief description of screening tests which are commercially available; only those tests providing normative data have been selected for review. Upon examination of these tests, one notes certain general deficiencies as well as test specific deficiencies which decrease their value as instruments for efficient use in public school screening programs. Such deficiencies include the following:

1. Many are too lengthy for efficient utilization for rapid screening.

2. The sounds tested appear to be selected from the standpoint of only one or two of the many variables that are worthy of consideration.

3. Most do not provide cut-off scores, placing the responsibility for determining the subsequent course of action totally upon the subjective judgment of the speech clinician.

4. Many of these tests are designed primarily for use with younger children and the stimulus material is not appropriate for the older pupils.

It appears that until more efficient, effective tests for rapid screening of articulation are developed, speech clinicians in public schools may find that the tests they have devised are more satisfactory. The standardization of some of these clinician-made tests might offer the possible solution for correcting this deficit area. Refer to Appendix C for information useful in selecting the appropriate phonemes for inclusion in rapid screening.

ASSESSMENT

According to Templin and Darley (1969), the purpose of testing the speech and language behavior of an individual determines the testing procedures and specific instruments to be utilized. When the purpose of testing is to obtain a detailed description and analysis of speech and language proficiency and to prescribe the nature of therapy, a battery of tests is required. Prior to conducting diagnostic procedures in public school settings, the permanent file of each pupil should be examined for relevant information. An evaluation of each pupil should include the following:

1. An audiometric screening test.
2. An oral peripheral examination.
3. An assessment of articulatory proficiency.
4. An assessment of language proficiency.
5. An assessment of other areas as appropriate.

The procedures for examining each of the areas enumerated are reviewed in the following sections:

AUDIOMETRIC SCREENING

Because of the relationship between hearing loss and certain speech, language, and voice disorders, it is desirable to screen the hearing of each pupil. The procedure is also valuable for detecting pupils with conductive hearing losses, not associated with speech problems, but which require medical management. When a hearing loss is suspected, the pupil should be referred to an appropriate specialist.

The committee on Audiometric Evaluation of the American Speech and Hearing Association has updated the work of Darley (1961) in developing a set of *Guidelines for Identification Audiometry* (1974). This committee has recommended the screening of the frequencies 1000 Hz, 2000 Hz, and 4000 Hz; it was noted that the frequency of 500 Hz should be eliminated for screening purposes, unless the screening is conducted in exceptionally quiet environments. The hearing levels recommended by the ASHA committee for screening are 20 db HTL (re: ANSI, 1969) at all frequencies and 4000 Hz at 25 db HTL, if the tone is not heard at 20 db HTL.

ORAL PERIPHERAL EXAMINATION

Clinical judgments related to the structure and performance of the oral mechanism are often difficult to make. Judgments of the adequacy of the articulators for speech production must encompass a wide range of individual differences related to size, shape, and motility of the structures. According to Johnson, Darley, and Spriestersbach (1963), most individuals are able to compensate for structural irregularities. When the speech clinician observes or suspects that the structures are inadequate, it must be determined whether physical management is warranted; accordingly, referrals to physicians or other specialists may be necessary. Adequacy of the articulators is an important consideration in the efficacy of therapy, particularly with organically involved clients.

Johnson, Darley, and Spriestersbach have suggested the following rating scale for judging the adequacy of the speech mechanism (p. 113):

1. Normal
2. Slight deviation—probably no adverse effect on speech
3. Moderate deviation—possibility of an adverse effect on speech if more than one structure is involved
4. Extreme deviation—sufficient to impede normal speech production and generally requires modification of the structure, with or without speech therapy

They have summarized the conclusions of research to-date, relative to assessing structure and performance of the articulators. These clinical considerations have been briefly described in the following sections.

Lip

Deviations in the lip structures rarely affect normal speech production unless paresis is involved. The research of Sprague (1961) and Bloomquist (1950) indicated that a motility factor of less than 3.0 /pʌ/ sounds per second is below average and 5.5 /pʌ/ sounds per second is above average. The symmetry and cosmetic appearance of the lips and philtrum should be noted, particularly if there is a cleft or repaired cleft of the lip.

Dental Abnormalities

Research supports the contention that individuals are generally capable of compensating for dental deviations, unless there are associated abnormalities. (Fymbo, 1936; Fairbanks and Lentner, 1951; Snow, 1961.) The production of sibilant sounds, however, may be impaired in cases of extreme malocclusions.

Tongue

While the tongue is generally a very mobile structure, its adequacy for normal speech production may be impaired by pathology of the speech musculature or nervous system, and accidents or diseases requiring the removal of portions of the tongue. In assessing the adequacy of tongue motility, the research of Sprague (1961) indicates that the average rate for articulation of /tʌ/ ranges between 3.0 to 5.5 sounds per second; rates of less than 3.0 sounds per second indicate that the tongue motility is below average. Fairbanks and Spriestersbach (1950) suggested a rate at which a normal person should be able to touch the aleveolar ridge with the tongue tip without speech; the average rate ranges from 3.5 to 6.0 contacts per second. Fewer than 3.5 contacts per second is considered below average. Because of the considerable differences with regard to normalcy among individuals, the implications for therapy may be more specifically determined by obtaining a comparison of tongue motility upon speech production and the motility rate for isolated movements.

Hard Palate

There appears to be no specific routine clinical judgments relative to assessing the adequacy of the contour of the hard palate. The two deviations most significant to speech production appear to be flat palatal vaults and high narrow vaults; the size of the tongue in relationship to the oral cavity may be an important consideration when one of these palatal deviations is present (Johnson et. al, 1963).

Soft Palate

There are several indices which must be considered in determining whether or not the soft palate and associated structures are adequate for normal speech production. While no pupil should be referred for a medical evaluation on the basis of exhibiting one characteristic of velopharyngeal incompetency, pupils who exhibit several characteristics are appropriate candidates for referral. When palatal insufficiency is suspected, it is important, too, that a medical history be obtained in addition to utilizing the specific techniques subsequently outlined. Variables such as a recent adenoidectomy may temporarily interfere with palatopharyngeal competence.

By employing the following techniques, the results will provide the rationale for judging whether or not a pupil should be referred for a medical evaluation (Coston, 1975).

1. Gross inspection of the palate noting the following:

    a. The length of the palate.

    b. The depth of the palatopharyngeal gap at rest and upon phonation.

c. The presence of a bifid uvula.

d. The amount and symmetry of movement and flexibility in lifting the soft palate toward the pharyngeal wall.

2. Assessment of intra-oral breath pressure by determining if the pupil can impound air in the oral cavity through blowing whistles, blowing up balloons, etc. or achieving a one-to-one ratio using an oral manometer.

3. Acoustic impressions regarding the presence of excess nasality and nasal escape.

4. Behavioral cues such as constriction of the nares.

5. Stimulability.

6. Assessment of articulatory proficiency, particularly of the pressure consonants.

LANGUAGE

As an integral part of the assessment process, the language proficiency of each pupil should be measured. Research has demonstrated an inextricable relationship between articulation and the other parameters of language. Quite often pupils who exhibit articulatory disorders exhibit deficiencies in morphology, syntax and semantics as well. The screening of language should be accomplished by utilizing a test which is designed to measure several components of language or utilizing a battery of screening tests which measure specific components. When the results of screening measures indicate a problem, a diagnostic test of language should be administered.

Appropriate screening tests of language may include but are not limited to the following:

1. *Screening Test for Auditory Comprehension of Language* (Carrow)

2. *Developmental Sentence Scoring* (Lee)

3. *Preschool Language Scale* (Zimmerman)

4. *Northwestern Syntax Screening Test* (Lee)

ARTICULATORY ASSESSMENT

In making an assessment of a pupil's articulatory proficiency, the instrument should be selected from the standpoint of what one purports to measure. According to informal surveys during site visitations to public school programs across the state, the *Goldman-Fristoe Test of Articulation* appears to be used extensively. While this test is relatively simple to administer

and score, it is not necessarily the most appropriate test for every pupil. The "Goldman-Fristoe" contains excellent stimulus pictures for younger pupils, but these may not be particularly appealing to older pupils.

Rather than acquiring several copies of the same instrument for articulatory assessment in a school district, it might be profitable to obtain several different tests which could be shared among clinicians (see Appendix A and B for test descriptions). The following information may be helpful in selecting other appropriate tests of articulation:

1. The *Iowa Pressure Articulation Test,* a sub-test of the *Templin-Darley Tests of Articulation,* yields more specific information regarding the relationship between production of pressure consonants and velopharyngeal competency than other articulation tests.

2. The *Arizona Articulation Proficiency Scale* yields an intelligibility ratio which can be used as a pre-test/post-test comparison.

3. *A Deep Test of Articulation* is constructed to measure consistency of error in various phonetic contexts.

4. The *Fisher-Logemann Test of Articulation Competence* measures articulatory proficiency in terms of distinctive features.

5. The *Predictive Screening Test of Articulation* provides a basis for determining whether or not to enroll first grade pupils for therapy.

ASSESSMENT OF OTHER AREAS

Appropriate referrals to other specialists may be necessary prior to or subsequent to assessment by the speech clinician. What the speech clinician suspects as being the nature of the speech and/or language disorder will dictate the areas to be assessed in addition to those prescribed as being essential for all pupils. Accordingly, the assessment should include:

1. Voice

2. Rhythm

3. Specific components of language—grammar, morphology, syntax, vocabulary

4. Auditory discrimination

5. Visual-perceptual skills

Unit III

INTERPRETATION OF ARTICULATION TEST RESULTS

Upon completion of the assessment, the results obtained through the testing of articulatory performance must be analyzed from the standpoint of the many variables influencing the severity of the problem and the implications for case management. Obtaining valid test results from standardized tests of articulation requires accurate interpretation. The clinician must possess knowledge of normal speech development as well as the competencies to identify the many variables that will influence the subsequent course of case management. Based on research, the following variables have been identified and described in their relationship to articulatory assessment and case management.

NUMBER OF ERRORS

Jordan (1960) reported that the number of defective sounds was the single most important variable in rating the severity of articulatory defects. While there is considerable agreement that the number of defective single sounds is related to severity (Perrin, 1954; Coston, 1969), several studies indicate that adhering strictly to the criteria of the number of defective sounds ignores other critical variables (Jacobson, Fant and Halle, 1965; Locke, 1968; Ringel, House, Burke, Dolinsky, and Scott, 1970). The research of Steer and Drexler (1960) indicated that the number of errors, the position of error sounds and the type of errors are interrelated and are all diagnostic and prognostic indices.

Snow (1961) studied large groups of children and concluded that certain errors are more common and should assume less importance in ratings of severity than errors which are more unusual. Similarly, Jacobson, et. al. (1965), suggest that every misarticulation may not have equal impact on severity and, therefore, should not be assigned equal value. It was reported by Steer and Drexler that the total number of defective sounds in all positions in words has predictive value.

Steer and Drexler further suggested that kindergarten children who show little or no improvement in reduction of the number of overall errors during that year, are likely to be candidates for speech therapy. The number of errors exhibited by young children, which are eliminated without therapy, is generally related to maturation (Blanton, Ballard and Blanton, 1916; Roe and Milisen, 1942; Saylor, 1942). Research indicates that a significant decrease in the overall number of errors occurs by the third or fourth grade (Templin, 1969), and that the effect of maturation on the number of errors may vary from one sound to another (Roe and Milisen, 1942).

Children whose speech is characterized by numerous errors, unrelated to maturation, have been reported to exhibit corresponding decrements in syntactical development, according to the studies of Menyuk (1964), Vandemark and Mann (1965), and Shriner, Holloway and Daniloff (1969). Studies by Whitacre, Luper and Pollio (1970) and Marquardt and Saxman (1972), suggest that children who exhibit numerous articulatory errors should be tested for language deficits. If language deficits are present, emphasis on the development of syntax should be included in the therapy program.

POSITION OF ERROR SOUNDS

Van Riper (1969) contended that the relative position of error sounds in words (initial, medial, or final) influences the intelligibility of speech production. Steer and Drexler (1960) determined that the total number of errors in all positions in words carried predictive value. The most consistent results of their study, however, were related to the number of errors in the final position, particularly when the phoneme was an error of omission.

Van Riper and Irwin (1958) supported the study of Wood (1949) in which a numerical value was placed on the consonant sounds relative to the frequency of occurrence of these phonemes in the English language. Wood attributed an equal value to the sound as it occurred in each position, but Van Riper and Irwin suggested that this system of valuation may not be equitable. Barker (1960), using the frequency of occurrence of sounds as identified by Travis (1930), assigned values to phonemes depending on their occurrence in the initial and final position. Templin related that the testing of phonemes in the medial position may be of less importance in the dynamics of conversational speech, a theory on which McDonald (1967) has elaborated.

A more recent view of the function of consonants in relationship to articulation may have an impact on the concept of "error position." Phonetic context, as defined by Griffith and Miner (1973, page 7), is the "totality of phonetic conditions that affect the production of a given speech sound." The definition provided by Griffith and Miner implies that articulatory performance is influenced by the phonemes preceding and following a specific sound. Although the differential effects of various sound combinations on articulation were recognized by earlier researchers [Nelson (1945) and Spriestersbach and Curtis (1951)], it was McDonald (1967) who transformed the concept of "phonetic context" into a clinically useful form. McDonald criticized three-positional testing and classified consonant sounds in terms of their impact on syllable production. The classification of consonants, according to McDonald, is based on their function of "releasing" or "arresting" a syllable.

TYPE OF ERROR

Research has demonstrated that the type of articulatory error has implications for judging the severity of the disorder and for serving as a prognostic indicator. As with each of the other

variables presented, which are crucial to interpretation of test results, consideration of the "type of error" alone has not proven to be a valid measure of severity or prognosis. The major classifications of misarticulations in terms of "type of error" include (1) substitution of one sound for another, (2) the omission of a sound and (3) the distortion of a sound. Van Riper and Erickson (1969) expressed regret at not considering this factor in the construction of *A Predictive Screening Test.* They later concluded that certain types of errors such as lateral omission of sibilant sounds or the distortion of the vowel /r/ are seldom overcome without speech therapy.

Jordan (1960) found that the omission of consonant sounds has a greater effect on severity than errors of substitution or distortion. He ranked misarticulation in order of severity as (1) omissions, (2) substitutions, and (3) distortions. A study by Shames and Fisher (1960) which tended to support Jordan's conclusions also indicated that errors of omission had more pronounced effect on intelligibility than the other classifications of errors. Snow and Milisen (1954a) concluded in an earlier study that errors of omission appeared to be the most immature of the three classifications, which leads one to conclude that errors of omission in older children may be related to developmental immaturity.

Roe and Milisen (1942) found that the most frequently occurring classification of misarticulations in grades one through six was that of substitutions of sounds. They also reported omission of sounds to represent the classification of errors least frequently occurring. This study indicated that the frequency of substitution errors decreased as grade level increased, while the frequency of errors of distortion increased. The conclusion drawn by Roe and Milisen suggested that earlier errors of substitution and omission often decrease with maturation, but until the correct pattern of production is developed the sounds may appear as distortions.

The previous statement that the "type of error" becomes significant only in the light of other variables has been verified by the research of Coston (1969). He studied:

1. the relationship between type of errors and intelligbility (page 25).

2. the relationship between phonemes and intelligibility disregarding error type (page 29).

3. the relationship between phonemes by error type and intelligibility (page 31).

His conclusion, simply stated, was that phonemes must be qualified by error type before judgments of intelligibility become meaningful. He found, for example, that omissions were not always more severe than substitutions; in fact, substitutions of /s/ affected intelligibility more than omissions of /r/.

CONSISTENCY OF ERROR

The results of an articulation test should be examined from the standpoint of "consistency of error" as this is generally considered to be one component in judging the severity of the defect. Research indicates that the more consistent articulatory errors are in occurrence, the less amenable they are to therapy (McDonald, 1967). Jordan (1960) found "consistency of error" to be the fourth most significant variable in rating severity. He also found "consistency of error" to increase proportionally with the number of errors.

"Consistency of error" refers to the frequency with which a certain sound(s) occurs in error. A determination of consistency implies a careful analysis of phonemes with regard to type of error, position, context of speech, phonetic features and phonetic context. For purposes of specificity in its relationship to consistency, it appears necessary to define "phonetic features," for this term encompasses several phonological dimensions. "Phonetic features" include voicing (voiced and voiceless), the manner of articulation (nasal, plosive, glide, and fricative), and the place of articulation (labial, lingual, dental, alveolar, velar, glottal, and various combinations).

The "consistency of error" has implications, not only for judging the severity of the defect, but for case management as well. Having identified certain points, substantiated by research findings, that may serve as rules of thumb, the present author has enumerated these points as follows:

1. Sounds consistently occurring in error are more difficult to remediate and generally would be the last sounds to incorporate in therapy (Templin, 1969).

2. Consistency in the substitution of a specific phoneme(s) should be analyzed as to whether this substitution is random or related to phonetic features; for example, upon careful scrutiny of a child's frequent substitution of /s/, it was found that /s/ was substituted for other glides, as opposed to being a random substitution (Weber, 1970).

3. Consistent misarticulation of high frequency sounds may be related to hearing loss (Templin, 1969).

4. Consistent omission of consonant sounds may be indicative of developmental immaturity (Snow & Milisen, 1954a); consequently, the speech behavior of mentally retarded children is often characterized by omissions of final consonant sounds.

5. Consistent misarticulations of phonemes involving impedance of the breath stream may result from malalignment of the teeth or other conditions which reduce proximal contact (Templin, 1969).

6. Sounds requiring intra-oral breath pressure (voiced) are more difficult to produce than are their counterparts (Templin, 1969).

7. A sound(s) may be used consistently because it is easier to produce in the presence of certain physical limitations (Templin, 1969).

8. Older children generally exhibit more consistencies of error than younger children; this relates, perhaps, to the habit strength of faulty conditioning, upon which the process of maturation is no longer effective (McDonald, 1967).

INCONSISTENCY OF ERROR

The inconsistency of error sounds, as a general rule, is inversely proportional to the severity of the defect. This factor must be considered as a separate entity from "consistency of error" when evaluating articulatory proficiency.

For the sake of clarification in interpreting the significance of "inconsistency of error," the following points are noteworthy:

1. Young children tend to be inconsistent in correctly producing sounds in the various positions in words (Amidon, 1941).

2. The misarticulations of most individuals tend to be inconsistent, when examined in various phonetic contexts (McDonald, 1967).

3. Inconsistencies of error can be accounted for in a lawful manner when viewed in respect to "phonetic context" (McDonald, 1967; Leonard, 1973).

4. Inconsistencies of a misarticulated phoneme(s) should be examined in various phonetic contexts, since those contexts in which the sound is correctly produced provides a rationale for the selection of key words to be utilized in therapy (McDonald, 1967; Zehel, Shelton, Arndt, Wright, and Elbert, 1972).

5. School age children appear to be less consistent in correctly producing single sounds in proportion to error, than in producing consonant clusters (blends) correctly (Roe & Milisen, 1942; Nelson, 1945; Buck, 1948; Hale, 1948). This suggests that words containing clusters, particularly the /s/ and /r/ clusters, may be good choices for stimulus words.

6. There appears to be a relationship between inconsistencies in articulation, and structural or neuro-muscular involvement of the oral mechanism. Cerebral palsy individuals, athetoids and spastics, are highly inconsistent in the production of /l/, /r/, and /s/ but correctly produce these phonemes more consistently in singles than in clusters (Powers, 1953). In respect to these findings, inconsistencies, however, must be considered as important only if there are other indices to support the presence of neuro-muscular deviations.

7. Cleft palate children are often inconsistent with regard to type of error and are more consistent in correct production of singles than clusters (Spriestersbach, Darley, and Rouse, 1956).

STIMULABILITY

The term "stimulability" refers to the ability of an individual to correct a misarticulated sound after several initial stimulations by the speech clinician (Milisen, 1954). Upon stimulation, the speech clinician provides visual, auditory, and tactile clues to the client and notes the ease or difficulty with which the client produces the sound in isolation. Van Riper and Irwin (1958, page 152) state that "sounds are more stimulable if they are imitated better in words than nonsense syllables and better in nonsense syllables than in isolation."

The value of providing stimulation is that the sounds which are immediately stimulable are the sounds most likely to show spontaneous improvement in young children (Snow and Milisen, 1954b; Carter and Buck, 1958; Farquar, 1967). The ability to imitate the correct production of sounds in words and in nonsense syllables indicates a favorable prognosis for speech therapy (Barnes and Morris, 1967; Sommers, Leiss, Delp, Gerber, Fundrella, Smith, Revuckey, Ellis, and Haley, 1967; Spiestersbach and Sherman, 1968). Similarly, a number of studies (Carter and Buck, 1958; Farquar, 1961, Stoia, 1961; Irwin, West and Trombetta, 1966; Kisatsky, 1966; Sommers, Cox, and West, 1972) have demonstrated that the ability of kindergarten, first and second grade children to effect improvement in sound production upon stimulation is related to articulation change. The exception to these findings is that stimulability does not appear to be a prognostic indicator for therapy with retarded children (Sommers et. al, 1972).

While the ability to improve sound production upon stimulation has prognostic implications for therapy, it is important that clinicians elicit both spontaneous and imitative responses as comparative measures. This contention is supported by the research of Snow and Milisen (1954b) which indicated that greater spontaneous improvement occurred in the speech production of children whose test scores were better on tests eliciting spontaneous responses than for those who were tested with stimulus materials eliciting imitative responses. It may be inferred from this finding that sufficient information can be obtained only when a comparison of the results of these two types of responses are compared.

Milisen (1954) suggested that stimulability is a key factor in selecting the sounds to be incorporated in therapy. He further contended that the sounds which are more visible and less complex in their formation will respond readily to stimulation and should be the first sounds selected for therapy. The sounds which the child had the greatest difficulty producing correctly upon stimulation would be introduced at later stages of therapy.

DIALECTAL DIFFERENCES

Most articulation tests appear to be rather insensitive to the consideration of dialectal differences in test standardization. In view of this, results of articulation tests should be

analyzed by the speech clinician from the standpoint of dialect when the client in question is representative of a minority group whose racial, ethnic, or socio-economic background differs from the population on which the norms were established. Viewing dialectal patterns strictly from the standpoint of their deviation from the phonological pattern of standard English results in many faulty assumptions.

Of the many dialects represented in the state of South Carolina, Black dialect is the most common. For this reason, the author has provided information relevant only to this phonological system. Two theories have been approached in dealing with the deviations of non-standard dialect: the "deficit theory" and the "difference theory." Wolfram (1969) explains that the deficit model describes nonconformity to norms as:

1. An indication of retarded speech.
2. The pathology of non-organic speech deficiencies.
3. The result of under-developed language capacity.

To utilize the "deficit model" would preclude that the presence of a dialect constitutes a speech disorder. The "difference model," on the other hand, views dialect as phonological systems with their own set of grammatical and pronunciation rules which are acceptable within a subculture but differ from the standard phonological system of English (Wolfram, 1969).

The difference model appears to be the more widely accepted theory; the proponents of this concept include Van Riper and Irwin (1958), Adler (1971), Fisher and Logemann (1971), and others. In accepting the difference model, one question still remains—should Black children be taught standard English? Johnson (1971) purports that without the skills to communicate in patterns of standard English, the Black child may be limited academically. Johnson's philosophy is that Black children should be allowed to retain the phonological system acceptable within their peer group, but would benefit from learning standard English as a second language (Smith, 1973).

While it would be unrealistic to assume that all members of a particular subculture would exhibit the same patterns of articulation, certain similarities in Black dialect have been identified. Shuy (1972) lists the major linguistic features of Black dialect (pp. 197 and 198) as described by Fasold and Wolfram (1970). These features include the following:

A. Pronunciation

1. Word-final consonant clusters (e.g., /st/test, missed; and /nd/find, canned).
2. The th sounds (e.g., think, nothing, tooth).
3. /r/ and /l/ (e.g., sister, nickel, help, four)
4. Final /b/, /d/, and /g/ (devoicing and deletion) (e.g., pig, salad, good, mud).

5. Nasalization (in the -ing suffix, nasalized vowels, and effect of nasal consonants on /I/ and /e/) (e.g., singin', run, and pen).

6. Vowel glides (e.g., time, boy, kite).

7. Indefinite articles "a" and "an" (e.g., an apple).

8. Stress (e.g., hotel, police).

9. Other pronunciation features (e.g., ask—axe, street—skreet).

B. Grammar

1. The -ed suffix (e.g., missed, started, said).

2. Perfective constructions (e.g., He gone home, He done it, I done forgot, I been had it).

3. The third-person-singular present-tense marker (e.g., He walk, He don't go, He have a car).

4. Future (e.g., He gonna go, I'ma go, He see you tomorrow).

5. Invariant be (e.g., Sometime he be busy).

6. Absence of forms of "to be" (He a man, You here).

7. The use of "ain't" (e.g., He ain't do that, He ain't here).

8. Multiple negative (e.g., Nobody didn't know it didn't rain, Can't nonbody do it).

9. Possessive (e.g., The boy hat, Jack's Johnson car, This he book, it mines).

10. Plural (e.g., five book, two deers, mens).

11. Question formation (e.g., I want to know did he go home).

12. The absence of preposed auxiliaries (e.g., He coming with us).

13. Pronominal apposition (e.g., My mother she came home early).

14. Existential "it" (e.g. It's a lot of people out there).

Unit IV

CASE SELECTION, SCHEDULING, AND DISMISSAL

In order for a school district to receive full state aid for a speech and language clinician in South Carolina, the clinician must provide habilitative services to at least seventy-five pupils and not more than one-hundred pupils during the course of the school year (Defined Minimum Program Standards, 1975). The caseload of a speech and language clinician may be composed of pupils requiring individual therapy, therapy in small groups of four to six pupils, or pupils in speech improvement/language development classes.

Speech clinicians in public schools are often confronted with large numbers of children who would benefit from speech and language services. The matter of case selection and scheduling, therefore, must be approached with the ever present dilemma of prioritizing pupils for services. The questions surrounding dismissal of pupils from therapy is also a recurring source of concern for conscientious speech clinicians. While criteria for case selection, scheduling and dismissal cannot be established in "cookbook" fashion, the utilization of a clinical approach to the identification, assessment and interpretation process will assist a clinician in making more objective decisions.

CASE SELECTION

In respect to case selection, it is imperative that speech clinicians recognize and make the distinction between an "impairment" and a "handicap." Revière (1962), in the *Rehabilitation Codes*, differentiates between these terms; an "impairment" infers a deviation from what is generally considered to be normal, but a "handicap" denotes the disadvantage imposed as the impairment approaches severity. This differentiation becomes significant when examining the alternatives in case selection relative to the specific pupil exhibiting articulatory errors. In general, the alternatives are placing the pupil:

1. On a waiting list.
2. In a speech improvement program.
3. In group therapy.
4. In individual therapy.

These alternatives, with implications for case selection, are discussed in the subsequent sections.

The Waiting List

Establishing a "waiting list" is probably the least satisfying responsibility of a speech clinician. One must become acclimated, however, to the fact that "waiting lists" are likely to remain with us for some time to come. Taking a positive view, these pupils are in a more tenable position for receiving services than those who at present have not been identified. Also, as the "waiting list" increases in number, so do the justification for acquiring additional personnel and the reinforcement to administrators and teachers of the need for speech and language programs in public schools. The "waiting list" should be reserved for:

1. Pupils who exhibit the milder speech and language problems (must be determined in relationship to all types of speech and language problems).

2. Pupils who, from the standpoint of prognosis, would not justify enrollment in the regular caseload to the exclusion of other pupils.

Speech Improvement

Speech improvement is the area of speech services which is designed for large groups of children. The major goal of these programs is to foster the general development of acceptable speech patterns in the early years, precluding stabilization of unacceptable speech patterns.

The efficacy of speech improvement programs in the elementary grades has been demonstrated to be effective in reducing the number of children requiring therapy at later stages of maturation (Wilson, 1954; Sommers, Cockeville, Paul, Bowser, Fitcher, Fenton and Copetas, 1961; Byrne, 1962; Pronovost, 1964). It appears, however, that speech improvement may not be as effective with mentally handicapped children (Coston, Weiss, Easterling, 1972).

Generally, speech improvement programs are provided in the classroom setting as part of the regular curriculum, although other models may also be appropriate. These programs are more frequently provided for kindergarten and elementary school pupils than for older groups. The research of Roe and Milisen (1942) indicated that maturational errors of articulation occur more often in the speech of pupils in kindergarten through fourth grade, than in older pupils. Templin's (1957) findings supported the results previously noted and indicated that, up until fourth grade, many children improve their articulation skills without individual speech therapy.

Speech improvement sessions are generally provided to the pupils on a daily basis for a period of 15 to 30 minutes. In designing a speech improvement program, the degree of involvement of the clinician may range from serving as a consultant to the classroom teacher, after providing the initial training, to conducting each daily session. The model to be utilized will depend on the needs of the pupils, the cooperation of the teacher, and the availability of the clinician's time.

Group Therapy

The pupils selected for group therapy, in terms of individual needs, should generally consist of pupils with mild to moderate articulatory problems. When there is a high prevalence of pupils with moderate to severe or severe articulatory disorders, it is sometimes necessary to place these pupils in group therapy, although this is not usually a satisfactory alternative.

In determining appropriate grouping of pupils, Van Hattum (1972) recommends that the articulatory proficiency of pupils be the primary consideration. Factors such as age and similarity of defective sounds were recognized as secondary in importance. While it appears that the priority he prescribed is contrary to general practice, it cannot be assumed that this approach is without justification. The grouping of children exists not for the purpose of convenience in scheduling, but of necessity in adapting programs in public schools to the demands of serving a larger number of children than is generally served in the clinical setting. McDonald (1967) emphasizes that "clinical rather than administrative" considerations should be the determination for enrollment for group or for individual therapy. The provision of appropriate services implies "individualization" according to the needs of the child, regardless of the therapy setting.

It is probable that administering therapy to a group of children with corresponding levels of proficiency would increase the rate of progress for each child. Coordinating therapy with several children at various levels of proficiency, even when the specific phonemes are a commonality, is not only difficult for the clinician but is more restrictive for the pupils who progress at faster rates. Pupils placed in group therapy based primarily on age and sounds in error are often inhibited from advancing to work on other sounds while the speech clinician attempts to maintain homogenity.

While many of the questions remain unanswered regarding the organization of group therapy, McDonald (1967, pages 155-157) provides information relative to some general guidelines for group therapy:

1. The size of the group should remain small and should not consist of more than six pupils.

2. The age ranges within a group should not span more than two grades. If the age range is too great, the older children will generally dominate the group.

3. Factors such as vocabulary, physical size, maturity, motivational levels, and personality should be given secondary consideration.

4. The constituency of the group is subject to change, but stability should be maintained when possible.

5. The use of games should not sacrifice "child-and-principle" orientation for "clinician-and-material" orientation.

Individual Therapy

Pupils with the most severe articulatory disorders should be selected for individual therapy. These pupils should be provided as comprehensive a program as possible, in regard to frequency and length of therapy sessions. In consideration of the severity of the articulatory problem, it is interesting to note the results of a study by Sommers, et. al. (1961) which indicated that young children with severe articulatory disorders and low prognostic scores improved more significantly from a combination speech improvement/individual therapy program than from speech improvement alone. The findings are precisely what one would expect, yet these results have practical application. When it is not possible to schedule a pupil with a severe articulation problem as often as necessary, a combination of speech improvement and/or group therapy and/or individual therapy would provide a more intensive program.

In selection of the caseload for individual therapy, the severity of the defect and the prognostic indices should be the most important criteria. An analysis of the caseload following case selection reveals the greatest portion to consist of pupils who exhibit functional articulatory disorders. Functional disorders are generally more amenable to therapy than are organic disorders. Characteristically, organic disorders are associated with cerebral palsy, cleft palate, hearing loss, and mental retardation.

While the consideration of prognostic indices are important, caution must be taken against faulty assumptions regarding the efficacy of speech and language therapy for pupils diagnosed as mentally retarded, orthopedically handicapped or emotionally handicapped. While it should be a matter of common acceptance, repetition may serve to reinforce the fact that the individual prognosis for these pupils will vary from poor to favorable as is the case with articulatory defective children otherwise considered normal. In view of this, they should be considered viable candidates for speech and language services in public schools.

McDonald (1967) prescribes that pupils whose speech production is highly unintelligible and representative of severe disorders should receive individual therapy. He also suggests that children whose "neuro-muscular dysfunctions or structural deviations require the development of compensatory articulatory movements" require individual therapy (p. 156). In addition, individual therapy should be provided to children who are highly distractible or who would disrupt group dynamics and impede the effectiveness of therapy for other pupils in a group setting.

SCHEDULING

The difficulties encountered in the scheduling of pupils for speech and language therapy is by no means unique to speech clinicians in the public schools of South Carolina. A nationwide survey by ASHA on scheduling practices indicated that one-half of the 705 speech clinicians returning the questionnaires were dissatisfied with the frequency of their therapy sessions; forty-three percent of these clinicians conducted individual therapy twice a week with each pupil and fifty-three percent conducted group therapy twice a week with each group. The method of scheduling most frequently utilized in South Carolina is the "itinerant" system; the

number of schools reportedly served and the frequency of sessions varies significantly among districts. Van Hattum (1972) reports that there are so many variations in approaches to scheduling that it is unrealistic to attempt to describe scheduling practices in a single model. He discusses the matter of scheduling and describes a number of different methods in *Clinical Speech in the Schools.*

The problems of scheduling pupils for speech and language therapy are intensified as the number of pupils and the number of schools which a clinician must serve increases. To date no method has been developed to insure that every pupil in every school is scheduled for the length of time and the frequency of therapy sessions required to afford maximum benefits. It is necessary, therefore, to approach scheduling from the standpoint of providing maximum services to the greatest number of pupils as is feasible and to work toward the remediation of the problem in as short a time as is possible, in order to expand services to other pupils.

In an effort to gain the maximum benefits for pupils in terms of scheduling, a process similar to the following should be considered:

1. Screen all schools (or as many as is feasible based on number of clinicians, number of schools, number of pupils, cooperation of administrators, etc.).

2. Assess each pupil according to the type of speech and/or language disorder indicated by the screening.

3. Prioritize the pupils requiring speech and/or language therapy within each school according to the severity of the disorder and the prognosis.

4. Prioritize the pupils from all schools according to the severity of the disorder and the prognosis.

5. Compare these lists and determine which schools indicate the greatest need for the services of the speech clinician and prioritize (it may not be feasible to serve all schools without additional personnel).

6. Determine which schools each clinician will serve (depending on the number of clinicians, the number of pupils within each school, the number of schools and geographic proximity, etc.).

7. Determine whether the "itinerant" or the "intensive cycle" plan would be the most efficient. (Within a district, some clinicians may utilize one plan and some the other since consistency is not as important in respect to the type of scheduling utilized as is the provision of quality programs.)

8. Schedule pupils with severe speech and/or language disorders in individual therapy for the length and frequency of therapy sessions as deemed necessary.

9. Schedule pupils with moderate speech and/or language problems in individual therapy or therapy in small groups for the length and frequency of therapy sessions as deemed necessary.

10. Schedule pupils with mild speech and/or language problems for therapy in small groups for the greatest length and frequency of sessions as is feasible.

11. Establish speech improvement/language development classes for pupils exhibiting mild speech and/or language disorders.

12. Establish a "waiting list" for pupils who cannot be served immediately and prioritize, so they can be added to the caseload as vacancies occur.

Itinerant Plan vs. Intensive Cycle Plan

A study conducted by Weidner (1966) and described by Van Hattum (1972) examined the feasibility of the traditional, "itinerant" plan (twice weekly for thirty minutes) as opposed to an "intensive cycle" plan. The intensive cycle plan was initiated in three schools where each pupil was scheduled for therapy four times weekly for a period of six consecutive weeks, occurring in two separate six week periods. The results of this study and similar ones appear to favor the intensive cycle plan for increasing the dismissal rate of pupils. Van Hattum further reported that a comparison of the dismissal rate for pupils in the Rochester, New York schools increased from 18 to 20 percent under the itinerant plan to a rate of 38 to 41 percent under an intensive cycle plan.

McDonald and Frick (1951) recommended that therapy be provided on an intensive basis when sound acquisition is the goal. During the stabilization and carry-over phase, they suggested that the frequency of therapy sessions can be reduced without jeopardizing progress. Sommers, Leiss, Fundrella, Manning, Johnson, Oerther, Sholly, and Siegel (1970) indicated that mentally retarded children, however, require intensive programs in all phases of articulation therapy in order to effect improvement.

The research regarding scheduling procedures tends to be somewhat inconclusive, but a positive correlation exists between intensive therapy and improvement/dismissal of cases. Van Hattum (1972, page 171) reports that the following general conclusions may be drawn about methods of scheduling:

1. Dismissal rates appear higher when therapy is provided four or five times weekly.

2. Larger numbers of children can be served more effectively by utilizing the intensive cycle plan.

3. Regardless of the scheduling system employed, the greater gains occur in the early stages of therapy.

4. Teachers and administrators report that the intensive plan provides more opportunities for the clinician to function as a regular staff member and is an easier system to maintain administratively.

5. Advantages of the intensive cycle plan as reported by clinicians are that:

   a. Pupils and teachers become more acclimated to the scheduled day and time of the therapy session.

   b. The time lost in traveling excessive distance between schools is reduced.

   c. The child appears to retain more of the content of the previous session.

DISMISSAL

A pupil is generally dismissed from therapy when (1) he is habilitated, or when (2) he has attained an optimal level of proficiency. The utilization of the criterion for "optimal proficiency" generally suggests the existence of precluding factors such as:

1. Intellectual limitations of a pupil.

2. Physical limitations of a pupil imposed by conditions such as cerebral palsy, or cleft palate.

3. Underlying emotional problems of a pupil.

4. Motivational level of a pupil.

While a speech and language clinician has virtually no control over the first three factors noted, the factor related to motivation warrants further consideration. A "motivated" clinician will thoroughly investigate every means to motivate a pupil prior to a dismissal on this basis alone. The selection of an alternate approach to therapy or the use of contingency management may assist a clinician in finding a remedy for the poorly motivated pupil.

To dismiss a pupil as "habilitated" generally implies that the terminal goals established at the beginning of therapy have been accomplished. It is unrealistic to assume that a pupil is not habilitated until he performs with one hundred percent accuracy, since most "normal speakers" rarely accomplish this feat. A safe consideration for dismissal would be that a pupil performs at a level of ninety-five percent accuracy. Pupils performing at a ninety percent to ninety-five percent level of accuracy are, in all likelihood, ready for a maintenance type of program; the frequency and length of therapy sessions may be reduced while moving the pupil toward dismissal.

Unit V

ACCOUNTABILITY PRACTICES RELATED TO CASE MANAGEMENT

This section outlines several practices which may serve to improve accountability in the provision of services to speech and language handicapped pupils. These practices relate to both administrative and programmatic considerations, and are namely:

1. The formulation of measurable goals and objectives.
2. The collection of baseline data and the charting of progress.
3. The utilization of contingency management.
4. The establishment of a comprehensive system of maintaining records.

While the applicability of these practices is clear, due to the brevity of the information presented in this handbook, it would be practical for speech and language clinicians to refer to additional sources of information.

THE FORMULATION OF GOALS AND OBJECTIVES

While the terms "goals" and "objectives" are often used interchangeably, they relate to different but equally important aspects of planning. The term "goal" represents a broader spectrum of desirable outcomes than does the term "objective." Objectives relate to the series of small steps which, when successfully completed, lead to the ultimate accomplishment of a goal. Such terms as "long-range," or "immediate" goals, and "instructional," "behavioral," and "performance" objectives commonly appear in the literature; the use of these various terminologies depends on the personal preference of an author. Regardless of the terminology utilized, the implication is to state the needs relative to a program or an individual client in measurable terms.

To be considered "measurable," a goal or an objective should contain the following components:

1. **What** is the desired outcome?

2. **When** will the desired outcome be accomplished?

3. **Who** will provide the means to accomplish the desired outcome?

4. **To whom** is the expected outcome and the means for accomplishment directed?

5. **Criterion** that will indicate accomplishment.

6. **Evaluation** to determine if the desired outcome has been accomplished. Until one becomes proficient in writing measurable goals and objectives, they should be examined carefully with respect to each component.

The following is an example of an acceptable performance objective:

By February 2, 1976, (When) Johnny (To Whom) will produce /s/ and /tʃ/ correctly in (What) the initial position in words (What) with 95% accuracy (Criterion) as measured by comparing the number of correct responses with the total number of (Evaluation) responses for 20 stimulus words presented by the speech clinician. (Who)

A competent speech and language clinician will readily note that several objectives must necessarily be accomplished preceding the sample objective presented. Additionally, several objectives must be met following accomplishment of the stated objective in order to meet the goal. The probable **goal** relative to the sample objective would be the following:

By May 26, 1976, (When) Johnny (To Whom) will produce /s/ and /tʃ/ correctly in (What) conversational speech (What), with 95% accuracy (Criterion), as measured by comparing (Evaluation)

the number of correct responses with the total number of responses

during a five minute period of conversation, elicited by the speech

Who

clinician.

If the evaluation indicates that the goal or objective has not been accomplished, the alternatives may be to:

1. Analyze the goal or objective. Was the length of time sufficient for accomplishing the desired outcome? Was the criteria realistic considering the level or ability of the pupil? Was the method of evaluation adequate for measuring the outcome? Were there additional objectives that should have been met prerequisite to accomplishment of the stated goal or objective?

2. Analyze the method used to accomplish the goal or objective. Were there other methods or techniques that would have elicited better results?

When the problem is identified, restate the goal and/or the objective, making the appropriate changes.

Formulating measurable goals and objectives is not a difficult task for a competent clinician once the basic components are understood. The statements which can be made by a clinician relative to pupil progress as a result of using performance objectives will be defensible rather than tenuous. The measurable accomplishment of a stated goal or objective will provide a clinician with a means of evaluating the effectiveness of the therapy techniques as well as a means of demonstrating pupil progress.

DATA COLLECTION AND CHARTING PROGRESS

Utilizing procedures of "systematic observation and recording" (Sloane and MacAulay, 1968, page 40) of verbal behavior are inherent in accountability practices. The collection of baseline data and the ongoing process of charting provides a more quantitative method of describing progress to teachers or parents than does a statement such as "Johnny is making good progress" or "Johnny is not progressing well." According to Diedrich (1971), the collection of baseline data and the charting of progress provides:

1. A means for analyzing the progress of all children on an equitable basis.

2. A means for tracking the specific progress of individuals, and visible, meaningful evidence that progress is occurring.

3. A means for comparing the production of target phonemes in words, sentences, and conversational speech.

4. A means of periodically evaluating whether the methods and techniques utilized are achieving the desired results.

After assessing the pupil's articulatory proficiency and interpreting the test results, a clinician selects the appropriate target phoneme or phonemes. Diedrich (1971) specified that the two major phases of articulation therapy consist of (1) sound acquisition and (2) carry-over. The phase of therapy and the therapeutic approach being utilized will determine the type of baseline data that the speech clinician needs to collect. For example, when the clinician is working on sound acquisition, she may need to elicit the sound in isolation, in consonant vowel combinations (nonsense syllables), and/or in words; if, however, carry-over is being approached, the sound should be elicited in conversational speech.

Several simple procedures were suggested by Diedrich in approaching the systematization of data collection and charting. These procedures include the following:

1. Eliciting speech in the context required for the level of proficiency of the client.

2. Charting the target phoneme(s) by counting the number of possible responses and the number of correct responses using a paper tally or a counting device. (See pages 79 and 81.)

3. Plotting the results on a graph. (See pages 78 and 80.)

Upon completion of the initial phase of collecting the baseline data, the behavioral goals and objectives may be formulated. The charting procedures may be repeated during each therapy session or intermittently during the therapy program. The data will indicate the degree of progress and assist the clinician in determining when the goals and objectives are accomplished.

CONTINGENCY MANAGEMENT

Using Contingency Management to effect behavioral changes has been a highly controversial issue in the past, but this technique is gaining impetus in the profession of speech pathology as evidenced by several of the current Programmed Articulation approaches to therapy (which will be described in Unit VI). The effectiveness of Contingency Management has been demonstrated with individuals of all ages; it is applicable for use with groups or individuals, with speech and language handicapped pupils who are, otherwise normal, as well as with pupils exhibiting such handicapping conditions as mental retardation, hearing impairments, emotional handicaps, learning disabilities, and multiple handicaps (Fargo, Behrns, and Nolen, 1970). The principles of Contingency Management evolved from operant learning

theory and is a powerful technique for effecting behavioral change as a result of certain consequences applied following the occurrence of a behavior. One should be knowledgeable in the procedures prior to practicing these techniques in view of the serious implications of improper use of these principles.

Contingency Management may be defined as a method of effecting changes in behavior, occurring as a result of purposeful manipulation of the external environment; behavior changes are effected by the use of reinforcement or punishment employed as a consequence of a behavior. Techniques of Contingency Management are used to increase the probability that a desired response will occur or to decrease the probability of the occurrence of an undesirable response. When the frequency of occurrence of a response increases as a result of the presentation of a stimulus following that response, the stimulus is referred to as a "positive reinforcer." This contingency process is called "positive reinforcement." If a response is strengthened by the removal of a stimulus following the response, the stimulus is referred to as a "negative reinforcer," and the contingency process is termed "negative reinforcement."

When the frequency of occurrence of a response is weakened as a result of the removal of a positive reinforcer which is replaced by a negative reinforcer, the procedure is referred to as "time out from positive reinforcement" or simply as "time out." "Time out" does not carry the connotations which the use of "aversive stimuli" or "punishment" does; an electric shock is an example of an aversive stimulus and has been utilized only in cases where an individual's life is jeopardized by the continuation of a behavior. Another means for decreasing the strength of a behavior is through the process of "extinction." Extinction of a behavior occurs when a stimulus, which was previously reinforcing, is removed entirely as the consequence of a behavioral response.

In utilizing Contingency Management, the "schedule of reinforcement" must be carefully selected in order to effect behavioral change. There are a number of reinforcement schedules which may be utilized; these schedules of reinforcement may be classified as "continuous" or "intermittent." Continuous reinforcement, as the term implies, occurs when the behavior is reinforced after each occurrence. In utilizing intermittent reinforcement, only certain occurrences of the desired behavior are reinforced (i.e., one out of 10 responses, one every 30 seconds). The teaching of a new behavior generally requires continuous reinforcement initially and as the desired behavior becomes established, intermittent reinforcement is applied. Careful consideration of the type of positive reinforcer is important, since what is reinforcing to one individual may not necessarily be reinforcing to another. A child who does not like chocolate is not likely to respond to reinforcement by the use of "M & M" candies; therefore, the reinforcer must be appropriate for the pupil. There are two major types of reinforcers: primary (unconditioned) or secondary (conditioned). Primary reinforcers are of the variety termed appetitional (food, drink); secondary reinforcers may be of a variety termed (1) manipulative (toys, trinkets, devices), (2) social (verbal or gestural indicating acceptance and pleasure) or (3) tokens (chips). The primary reinforcers are related to biological functions, while secondary reinforcers acquire reinforcement value by being paired with stimuli already having value as a reinforcer.

The gradual process of behavior change or the acquisition of a new behavior occurs through "shaping." Shaping is accomplished by systematically changing the criteria for what is accepted as appropriate responses while providing reinforcement. As the pupil makes "successive approximations" toward establishing the desired behavior, the criteria for acceptance becomes increasingly more stringent. Ultimately, only the responses representing the desired target behavior are accepted and reinforced.

The present section has addressed the techniques of Contingency Management very superficially by introducing some of the terminologies. As was previously noted, it is a powerful tool which requires a great deal of practice to obtain proficiency in its utilization. Texts, such as *Operant Procedures In Remedial Speech and Language Training, Behavior Modification in the Classroom, Behavior Modification in Mental Retardation* and the tape series, *Basic Concepts of Behavior Modification In Speech Therapy,* may provide assistance in learning the techniques of Contingency Management.

COMPREHENSIVE SYSTEM OF MAINTAINING RECORDS

The maintenance of accurate, complete records and the transmittal of information to appropriate persons regarding the results of screening, assessment, and pupil progress are essential for purposes of accountability. Section 921-295.14 of the 1972 *South Carolina Code of Laws* requires that "procedures shall be established to insure provision and maintenance of current, complete records and reports for every pupil receiving diagnostic, instructional and habilitative services." Public Law 93-380 guarantees parents the right to review all records pertaining to their child and requires the development of a comprehensive system of record keeping. It would be prudent, therefore, for clinicians to examine the present system of record keeping being utilized for speech and language handicapped pupils within his or her school district.

Individual pupil records should be maintained in a manner insuring propriety and continuity and should be maintained in a central location that is accessible to authorized personnel. Each pupil's file should contain the following information:

1. Written parental permission prior to enrollment in individual or group therapy, or documentation that procedural due process was followed. (See pages 70 and 71.)

2. Pertinent case history information obtained from the permanent file or from teachers and parents.

3. A chronology of services related to speech and language rendered by the speech and language clinician, other appropriate specialists or agencies.

4. Copies of all standardized or informal tests utilized in the assessment, including the dates of administration and the name of the person administering the test.

5. Copies of evaluation reports, progress reports and summary reports, including the date of the report and the name of the person completing the report.

6. Individual therapy plans for the pupil.

7. Written parental authorization for the release of information about the pupil prior to transmitting information to individuals or agencies outside the school system.

In addition to the information maintained in the central file, a form should be developed to be retained in the permanent folder of each pupil to indicate the date(s) of assessment, enrollment in therapy and dismissal. Periodic progress reports should be sent to parents and building principals.

Unit VI

APPROACHES TO

ARTICULATION THERAPY

Because of the diversity in the nature and severity of articulatory disorders and because the therapy program must be individualized to meet the needs of each pupil, it is important that speech clinicians be familiar with several therapeutic approaches. The purpose of this unit is to provide a brief overview of several alternative approaches to articulation therapy.

TRADITIONAL APPROACH

The oldest and possibly the most commonly utilized approach to articulation therapy is the "traditional" procedure described by Van Riper. The methodologies of the traditional approach, according to Van Riper (1963), include:

1. Auditory (Ear) Training

   The clinician provides auditory stimulation for the target phoneme in syllables, words, phrases, sentences and conversational speech. The child learns to identify the target sound and to distinguish auditorily between the correct and incorrect production of the sound as produced by the speech clinician.

2. Establishment and Stabilization

   The child learns to produce the phoneme correctly in isolation. When the correct production of the phoneme is stabilized in isolation, the child proceeds to establishment and stabilization of the phoneme in each position in syllables and words, in phrases and sentences, and ultimately, in conversational speech. Van Riper's techniques for establishment of the correct phoneme production include utilizing phonetic placement, modification of the child's production of the target phoneme, progressive approximation and key words.

3. Carry-over

   After effecting stabilization of the phoneme in conversational speech within the therapy program, the speech clinician provides monitoring of the child's speech in other settings to insure that carry-over is occurring.

SENSORY MOTOR APPROACH

McDonald (1967) prescribes the utilization of a sensory-motor approach to articulation therapy. Reflecting his philosophy, the goal of therapy is to assist the individual to "increase the number of phonetic contexts in which the sound is produced correctly" (page 133). The use of this approach requires an analysis of articulatory proficiency utilizing "deep testing," which enables the clinician to determine specific contexts in which a sound is consistently or inconsistently in error. McDonald's "sensory-motor" approach to articulation therapy is directed toward the accomplishment of the following objectives:

1. Increasing the individual's sensitivity to the auditory, proprioceptive and tactile patterns associated with the sequential and interrelated movements of articulation.

2. Reinforcing the correct articulation of the sound in error.

3. Establishing the correct production of the error sounds in various phonetic contexts.

In order to accomplish the first objective, the speech clinician presents activities to facilitate lip, tongue, and jaw movements in various bi-syllables, using the sounds the child can articulate correctly, and varying the patterns of stress. Objective two is accomplished by selecting a target sound which is correctly articulated in at least one phonetic context, and having the individual utilize slow motion speech while varying the stress patterns in disyllabic combinations and in sentences. The third objective is accomplished by modifying the movement patterns in which the sound is correctly produced by varying the vowel combinations and practicing this modified context in various word combinations and sentences.

McDonald does not advocate the use of games as motivational devices. He suggests that there is more carry-over when the child is given the responsibility of developing his speaking skills. He also stresses the importance of relating these skills to the child's everyday speaking situations.

DISTINCTIVE FEATURES APPROACH

Traditionally, the descriptive terminology utilized in analyzing linguistic components of the phonological system of spoken English include manner, place and voicing. In applying a distinctive features approach to articulation therapy, Pollock and Rees (1972) suggest that consideration should be given to:

1. Whether or not a specific feature is totally absent from the speech repertoire of a child.

2. Whether all the features pertinent to production of a specific phoneme are present in one phonetic context but absent in another.

3. Whether all the features are present with respect to phoneme production but inappropriately incorporated into the child's phonemic system, depending on positional variables of the phoneme within a word.

4. Whether a feature appears in combination with one or more features but not in combination with certain other features.

The *Fisher-Logemann Test of Articulation Competence* serves as a diagnostic tool for evaluating the articulatory production in terms of distinctive features. The basic tenet underlying a distinctive features approach to articulation therapy is that by teaching the correct sound production of one target phoneme, it will generalize to phonemes with corresponding phonetic contexts.

PAIRED – STIMULI APPROACH

The paired-stimuli approach to articulation therapy was designed and tested by Weston and Irwin (1971). Their work extended the theoretical use of paired-stimuli by previous researchers into a clinically applicable form. The technique of paired-stimuli provides for a structured approach to therapy and incorporates the principles of learning theory.

In the paired-stimuli approach, key words are selected in which,

1. The target phoneme can be produced correctly.

2. The target phoneme occurs only once.

3. The target phoneme occurs in the same position, with reference to the words in which the phoneme is incorrectly produced.

Pictures representing a key word are presented simultaneously with words in which the phoneme is not correctly produced and the child is asked to identify the pictures. Reinforcement is provided when the key word is produced correctly and when the pupil produces the sound correctly in the words formerly in error. Using the paired-stimuli approach, no demonstration of the correct production of the target phoneme is provided by the clinician. No instructions are provided other than asking the pupil to identify the sound (Weston and Irwin, 1971).

According to Weston and Irwin, (1971) the paired-stimuli approach requires a minimum of training in its utilization. It provides a systematic efficient method of remediating articulatory errors, and the child appears to achieve carry-over.

PROGRAMMED ARTICULATION

Winitz (1969, page 275) defines a program as a "standard sequence of operations or events which has been determined to increase most effectively the acquisition of a desired response, task or skill." In recent years a number of formal programs for remediation of articulatory disorders have been developed. These programs represent various approaches to articulation therapy which are incorporated with the principles of learning theory.

Perhaps the rejection of "programmed articulation" by some speech clinicians is related to a concern about depersonalizing and "mechanizing" the client-clinician relationship. Rapport between the client and the clinician is very important; however, this should not preclude the importance of utilizing procedures which ultimately may be more effective in accomplishing the goals established for the client. To be effective as speech clinicians, we must cultivate an open mind toward accepting new techniques and approaches and be willing to modify established therapeutic methods in order to provide each client with maximal opportunities for developing or improving his communicative skills.

In the following subsections, several Programmed Articulation designs which are available commercially are described.

SWRL Speech Articulation Kits

The SWRL kits have been developed to teach the target phonemes /s/, /l/, /r/ and /th/; the basic format of these programs is derived from the traditional approach. Each kit contains:

1. An assessment booklet consisting of pre- and post-tests.
2. A modification program progressing in difficulty from producing the sound in isolation to stabilizing the sound in conversational speech.
3. An extension program which consists of additional practice material which can be presented by teachers, parents, aides or older pupils.
4. Individual record cards for monitoring progress.

Modification of the Frontal Lisp Programmed Articulation Kit (S–Pack)

The S–Pack was developed by Mowrer, Baker and Schutz (1970) and field tested by the Southwest Regional Laboratory for Educational Research and Development of Los Alamitos, California. Underlying its development was the assumption that a program such as this would enable speech clinicians to correct a frontal lisp in a short period of time and, therefore, provide the speech clinician with time to work with more severe articulatory problems.

The S–Pack was designed to be administered in three sessions. The program includes pre- and post-tests, therapy materials and individual recording sheets. A training tape was developed in order to train speech clinicians and other persons not familiar with the S–Pack.

A research project, conducted by the speech and hearing staff in the Dallas, Texas independent school system, proved most successful in utilizing the S–Pack (Clark, 1974). This program proved to be effective for correcting lateral lisps, omissions, distortions and substitutions of phonemes in addition to / θ / and / ð /, for which it was initially designed. The effectiveness of the S–Pack program in the Dallas school system resulted in the adoption of this program on a permanent basis.

Language Master Articulation Therapy Program

This program was developed for Bell and Howell by Dr. Jerry Griffith and Dr. Lynn Miner of the Department of Speech Pathology and Audiology, Eastern Illinois University. The program consists of the following units:

1. *Building Basic Articulation Skills Unit.* This unit includes a manual which discusses certain basic premises underlying the design of articulation therapy as approached through phonetic context, specific suggestions for therapy related to various other therapeutic approaches, and the plotting of progress. Stimulus words are derived from the one thousand most frequently occurring words in spoken English and represented in various phonetic contexts. The program emphasized the nine most frequently mis-articulated phonemes.

2. *Syllable Training Unit.* This unit includes a manual which discusses various etiologies of articulatory disorders and the importance of syllable training. A syllable generator is included which may be utilized to present all possible consonant/vowel combinations in the English Language.

3. *Drill Materials Unit.* This unit includes additional materials for drill work on syllables, words, and connected speech samples generated through phrases, sentences, reading passages and various conversational topics.

4. *Reinforcer/Counter Unit.* This unit provides a method for measuring the number of correct versus incorrect responses initiated by the client during therapy. A signal light serves to reinforce the client's appropriate responses.

The Monterey Articulation Program

This approach to therapy incorporates learning theory with the concept of a universal program design for remediation of articulatory disorders. Prior to initiating therapy, the pupil is tested and placed on an appropriate level from which therapy proceeds. The Monterey Program consists of:

1. An "establishment" phase where emphasis is directed toward the acquisition of correct phoneme(s).

2. A "transfer" phase where the emphasis is on carry-over of the target phonemes into various contexts of speech.

3. A "maintenance" phase where the emphasis is toward stabilization of the target sounds.

The Monterey approach allows a pupil appropriate alternatives if he fails to accomplish the sequence of steps at any phase of the program; these alternatives are referred to as "branching." According to the Behavioral Science Institute of Monterey, this program design provides for an individualized therapy program for each pupil. Its effectiveness has been demonstrated for pupils representing various etiologies and classifications of articulatory disorders. The program is appropriate for persons of all ages, as well as for group or individual therapy.

Clinicians are required to undergo a two-day training period prior to using this program. Those who become proficient in the use of the *Monterey Articulation Program* may become certified trainers. All materials necessary for therapy are included in the program, with the exception of tokens for reinforcement.

Unit VII

PROGRAM ADMINISTRATION

and

CASE MANAGEMENT:

A MODEL

The purpose of this unit is to present a workable model for demonstrating the interrelationship between case management and the aspects of program administration which occur simultaneously, from the time of initial identification through the actual therapy program.

INITIAL IDENTIFICATION

Notifying Parents

During the first week of school the following notice was sent to parents in accordance with procedural due process.

TO: Parents of Oak School Pupils

FROM: Bill Smith, Principal

SUBJECT: Notification of Speech, Language and Hearing Screening

As part of the educational program of Oak School, all pupils will be screened for possible speech, language and hearing problems. Follow-up testing will be provided for those pupils who fail the initial screening.

If your child fails the screening, you will be contacted by the speech and language clinician or the school nurse.

We feel very fortunate that we are able to provide these services for your child. Adequate speech, language and hearing skills are necessary for a pupil to perform satisfactorily in the educational program. If, however, you do not wish these services for your child, please contact me.

Screening

Johnny Brown, a fifth grade pupil was identified through screening as a potential candidate for speech services. A test for rapid screening devised by the speech clinician was utilized.

COLLECTING PERTINENT CASE INFORMATION

The following information was obtained from the health card in Johnny's permanent file:

Date of Birth:	November 5, 1964 Age: 11 years
Medical History:	No significant problems noted
Educational History:	Functioning on grade level; academic achievement above average
Social Adjustment:	No apparent problems

ASSESSMENT

The principal and teacher were notified of Johnny's schedule for the assessment. The assessment was scheduled for September 15, 1975 and included the following:

Audiometric Screening

The frequencies 1000 Hz, 2000 Hz and 4000 Hz were tested at 20dB HL.

Interpretation of Results:

No evidence of hearing loss.

Oral Peripheral Examination

Structural deviations – none noted

Functional adequacy – some difficulty elevating tongue tip

Interpretation of Results:

No significant deviations since Johnny was able to produce the phonemes /d/ and /t/ accurately in conversational speech.

Language Screening

The Screening Test for Auditory Comprehension of Language was administered.

Interpretation of Results:

Johnny's language skills are adequate for communication since his language comprehension appeared commensurate with his chronological age.

Articulatory Assessment

The *Goldman-Fristoe Test of Articulation* was administered and the following phonemes were noted to be in error:

	Initial	Medial	Final
Substitutions	t/tʃ, f/θ, tʃ, t/s, d/z, d/dʒ, w/r	f/θ, d/ð, w/r	f/ø
Omissions		/tʃ/, /s/, /z/, /ʃ/, /dʒ/	/s/, /z/, /dʒ/, /dʒ/, /ʃ/, /tʃ/, /r/
Distortions	None	None	None

Consonant Blends: /skw/, /sl/, /st/, /br/, /dr/, /kr/, and /tr/ were in error

Interpretation of Results:

Number of errors – 29 out of 72 items

Position of errors – all positions

Type of errors – primarily substitutions in the initial position and omissions in the medial and final positions.

Stimulability – with several repeated attempts, Johnny was able to approximate the correct production of all sounds in error, with the exception of /r/.

Consistency of errors – *A Deep Test of Articulation* (E.T. MacDonald) was administered to test the phonemes /s/, /tʃ/, and /z/. Low percentage scores were revealed for each sound

tested, indicating that Johnny is highly consistent in his erroneous production of the phonemes tested. The phonetic contexts in which the phonemes were correctly produced were noted for their therapeutic value.

Dialectal Differences – none apparent

Rationale for Diagnosis:

Johnny exhibits a moderate to severe articulatory disorder. The diagnostic decision was based on the results of the assessment as previously described and upon (1) the relationship of the sounds in error to his chronological age (See Appendix C) and (2) the frequency of occurrence of these phonemes in the language (See Appendix C).

Rationale for Prognosis:

The prognosis for articulation therapy appears favorable since Johnny was able to modify the production of his sounds in error upon stimulation and there is no apparent organic involvement.

REPORTING THE RESULTS OF ASSESSMENT

Notification of the assessment results must be provided to the parents/surrogates. Documentation of "informed consent" by the parents/surrogates must be a matter of record in the district. Normally, this would imply that parental signatures be obtained prior to enrolling a pupil for speech/language therapy. The notification should contain information similar to that included in the following sample:

Dear Mr. and Mrs. Brown:

As part of the educational program at *Oak School*, speech clinicians test the speech and language skills of each pupil. Services in the area of speech and/or language are provided for those pupils who require special assistance in developing or improving their speech and/or language skills.

The results of testing indicate that *Johnny* needs assistance in the area of *speech* in order to *correct some of the speech sounds that he produces incorrectly.*

On *September 15, 1975, Johnny* was given the following tests in the areas noted:

Speech	Language	Hearing
The Goldman-Fristoe Test of Articulation	Screening Test of Auditory Comprehension of Language	Routine audiometric screening

A Deep Test of Articulation

Assessment of the structure and function of the speech mechanism

I feel that *Johnny* would benefit from enrollment in *individual therapy* to improve his *speech* skills.

Please detach the following form and return it to his teacher. Please feel free to contact me at *728-6630* is you wish to obtain more information.

Sincerely,

Mary Jones

Speech Clinician

_____ I would like for my child to be enrolled in the speech and/or language program.

_____ I do not wish for my child to be enrolled in the speech and/or language program.

_____

Signature of Parent

Upon receipt of written parental permission for enrollment or upon the passage of the ten-day period for registered or certified letters, the following form required by the South Carolina Department of Education should be completed and submitted to the appropriate person (principal, coordinator of speech services, coordinating clinician, etc.) for placement in the permanent folder.

PARTICIPATION/ENROLLMENT FORM

SPEECH/LANGUAGE HANDICAPPED

Name *Johnny Brown* Birthdate *November 5, 1964*

Grade *5* Age *11*

Nature of Problem *Moderate to Severe Articulation problem — no organic involvement*

1. Screening

   Date *September 3, 1975* Screening Conducted by *Mary Jones*

2. Assessment

   Date *September 15, 1975* Person Administering Tests *Mary Jones*

   Tests administered *audiometric, oral peripheral, Goldman-Fristoe Test of Articulation, Screening Test of Auditory Comprehension of Language, A Deep Test of Articulation*

3. Recommended Program (indicate date)

   SI/LD _____

   Group Therapy _____

   Individual Therapy *September 22, 1975*

4. Re-assessment

   Date _____ Tests Administered by _____

   Tests administered _____

5. Has "Procedural Due Process" been followed? *yes*

6. I certify that *Johnny Brown* (Name) has met all criteria for participation in a program for speech/language handicapped

   Signature _____
   Person placing child in speech/language program

In addition, the speech clinician should prepare a brief report of the assessment results to be maintained in the speech folder for planning purposes. A list of the pupils enrolled in therapy and their scheduled time should be submitted to appropriate persons (building principal, teachers, coordinator of special services, coordinating clinician, etc.).

THE THERAPY PROGRAM

Since Johnny's problem did not require referral to other specialists prior to initiating therapy, he was scheduled for three thirty-minute therapy sessions each week on an individual basis. A multiphonemic approach was selected for therapy with the target phonemes /s/ and /tʃ/. Because of the similarities of distinctive features, it was felt that improvement in Johnny's production of these phonemes would generalize to the /ʃ/, /dʒ/ and /z/.

Collecting Baseline Data

The first step in therapy was to collect baseline data on the target sounds to serve as a criterion for measuring progress. The baseline data indicated that:

1. Johnny produces /s/ correctly in isolation, with 10 percent accuracy as measured by comparing the number of correct responses with the total number of responses to twenty stimulus sounds presented by the speech clinician.

2. Johnny produces the /tʃ/ correctly in isolation, with 20 percent accuracy as measured by comparing the number of correct responses with the total number of responses to twenty stimulus sounds presented by the speech clinician.

Formulation of Goals and Objectives

Goal:

By May 26, 1976, Johnny will produce /s/ and /tʃ/ correctly in conversational speech with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses during a five-minute period of conversation elicited for each sound by the speech clinician.

Short-Range Objectives:

1. By October 16, 1975, Johnny will produce /s/ and /tʃ/ correctly in isolation with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses to twenty stimulus sounds presented for each sound by the speech clinician.

2. By November 17, 1975, Johnny will produce /s/ and /tʃ/ correctly in the initial position in syllables with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses to twenty stimulus items presented for each sound by the speech clinician.

3. By December 11, 1975, Johnny will produce /s/ and /tʃ/ correctly in the final position in syllables, with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses to twenty stimulus items presented for each sound by the speech clinician.

4. By January 12, 1976, Johnny will produce /s/ and /tʃ/ correctly in the medial position in syllables, with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses to twenty stimulus items presented for each sound by the speech clinician.

Long-Range Objectives:

5. By February 2, 1976, Johnny will produce /s/ and /tʃ/ correctly in the initial position in words, with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses to twenty stimulus words presented for each sound by the speech clinician.

6. By February 23, 1976, Johnny will produce /s/ and /tʃ/ correctly in the final position in words, with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses to twenty stimulus words presented for each sound by the speech clinician.

7. By March 15, 1976, Johnny will produce /s/ and /tʃ/ correctly in the medial position in words, with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses to twenty stimulus words presented for each sound by the speech clinician.

8. By April 5, 1976, Johnny will produce /s/ and /tʃ/ correctly in phrases with 95 percent accuracy, as measured by comparing the number of correct responses with the total number of responses to twenty stimulus phrases presented for each sound by the speech clinician.

9. By April 29, 1976, Johnny will produce /s/ and /tʃ/ correctly in sentences with 95 percent accuracy as measured by comparing the number of correct responses with the total number of responses to twenty stimulus sentences presented for each sound by the speech clinician.

If the short-range and long-range objectives are met as stated, then by May 15, in all probability the goal will be attained. Baseline data should be collected prior to initiating each

new objective, and the last several minutes of the therapy session can easily be set aside to measure quantitatively the progress in therapy for that day. When the criterion of 95 percent is met, the pupil is proficient enough to move on to the next objective. The first several minutes of each therapy session may be utilized to elicit several stimulus items based on the previous objective to insure that the child is maintaining the correct production.

Using Contingency Management

Initially, when the emphasis in therapy is toward establishing the sound, reinforcement should be provided on a continuous schedule. As progress toward shaping the correct response occurs, reinforcement should be intermittent, provided after a certain number of correct responses or after a certain length of time. As previously noted, there are a number of possible types of reinforcers, but with the majority of pupils the establishment of a token economy is possible. The most important considerations in utilizing a token economy are that:

1. The child understands how a token economy works; for example, 5 cups of tokens = 1 chip, 3 chips = 1 pencil.

2. The number of tokens required to earn a reward are realistic for each child.

3. The reward is, in actuality, something that the child feels is worth working for.

4. An occasional token for good behavior is given, particularly if one of the objectives is improvement in areas of behavior or if the child is putting forth the effort but is experiencing a great deal of difficulty in earning tokens for good speech production.

The therapeutic approach and the methods employed often reflect the philosophy of the training program from which one was graduated. Many clinicians choose to utilize a "game" oriented approach to therapy. If this is a preference, it is important to keep the games simple. The more responses elicited from a child, the greater are his opportunities for practice, and most of us are familiar with the old adage about practice. Current therapeutic practices appear to be moving away from this method in favor of a behaviorally oriented method such as contingency management.

Charting Progress

Speech clinicians may wish to devise a simple response sheet for recording responses and a progress chart similar to the ones presented in this unit.

RESPONSE CHART

Name *Johnny Brown* Speech Clinician *Mary Jones*

Phoneme */s/* School Year *1975–76*

Objective *Establish /s/ in isolation*

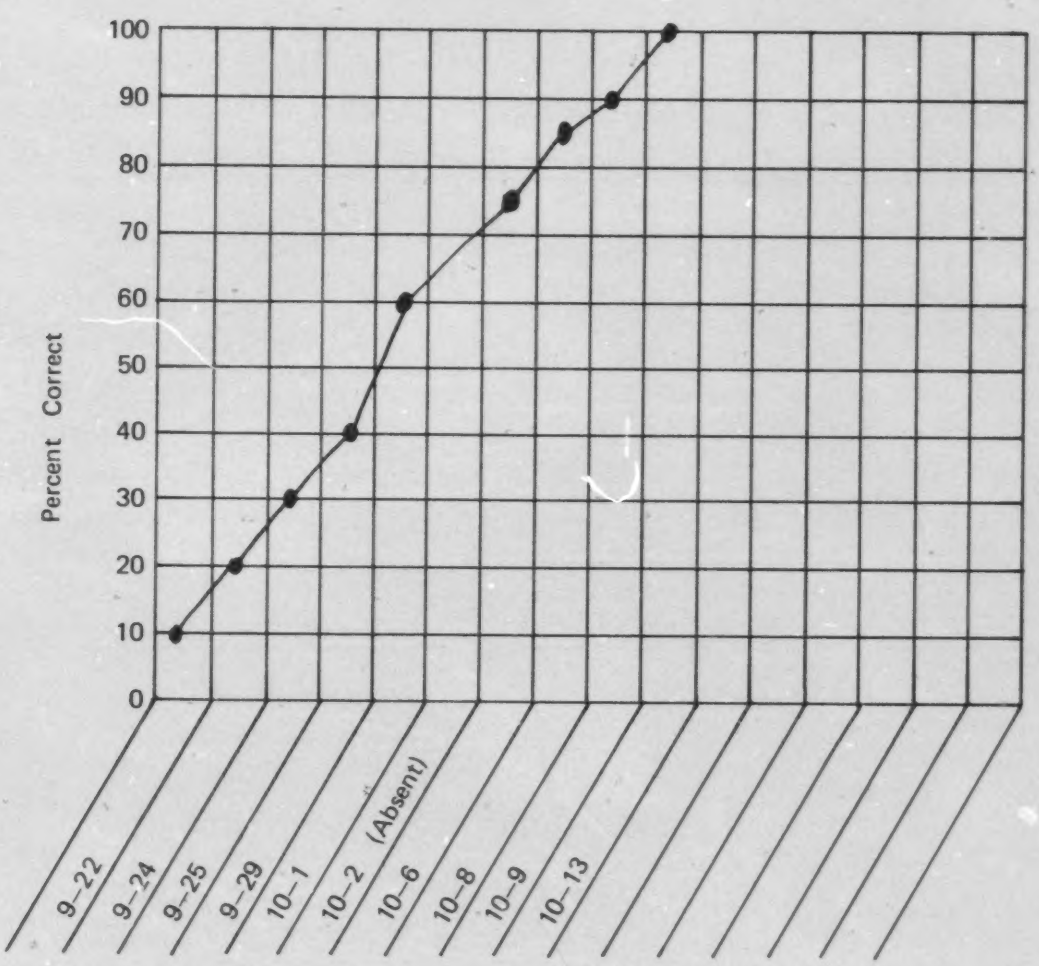
	X=incorrect 0=correct reinforced ϕ – correct not reinforced																				Correct	
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	No.	%
9–22	X	X	X	X	X	X	X	X	X	X	X	X	0	X	X	X	X	0	X	X	2	10
9–24	X	X	X	0	X	X	X	X	0	X	X	X	X	X	X	0	0	X	X	X	4	20
9–25	X	X	0	X	X	0	X	X	0	X	X	X	0	0	X	X	X	0	X	X	6	30
9–29	0	0	X	X	X	0	0	0	0	X	X	X	X	X	0	X	X	X	X	0	8	40
10–1	0	ϕ	0	X	X	ϕ	0	ϕ	ϕ	ϕ	X	X	X	0	ϕ	0	ϕ	X	X	X	12	60
10–2	A	B	S	E	N	T																
10–6	0	ϕ	ϕ	ϕ	ϕ	X	X	ϕ	ϕ	ϕ	ϕ	X	ϕ	0	X	X	ϕ	ϕ	ϕ	ϕ	15	75
10–8	0	ϕ	ϕ	ϕ	X	X	X	ϕ	ϕ	ϕ	ϕ	ϕ	X	ϕ	0	ϕ	ϕ	ϕ	ϕ	ϕ	17	85
10–9	0	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ	ϕ	X	0	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	18	90
10–13	0	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ	ϕ	0	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	19	100

50

PROGRESS CHART

Name *Johnny Brown* Speech Clinician *Mary Jones*

Phoneme */s/* School Year *1975–76*



Objective */s/ in isolation* Objective _____ Objective _____

Completed *10/13* Completed _____ Completed _____

RESPONSE CHART

Name *Johnny Brown* Speech Clinician *Mary Jones*

Phoneme */tʃ/* School Year *1975–76*

Objective *Establish /tʃ/ in isolation*

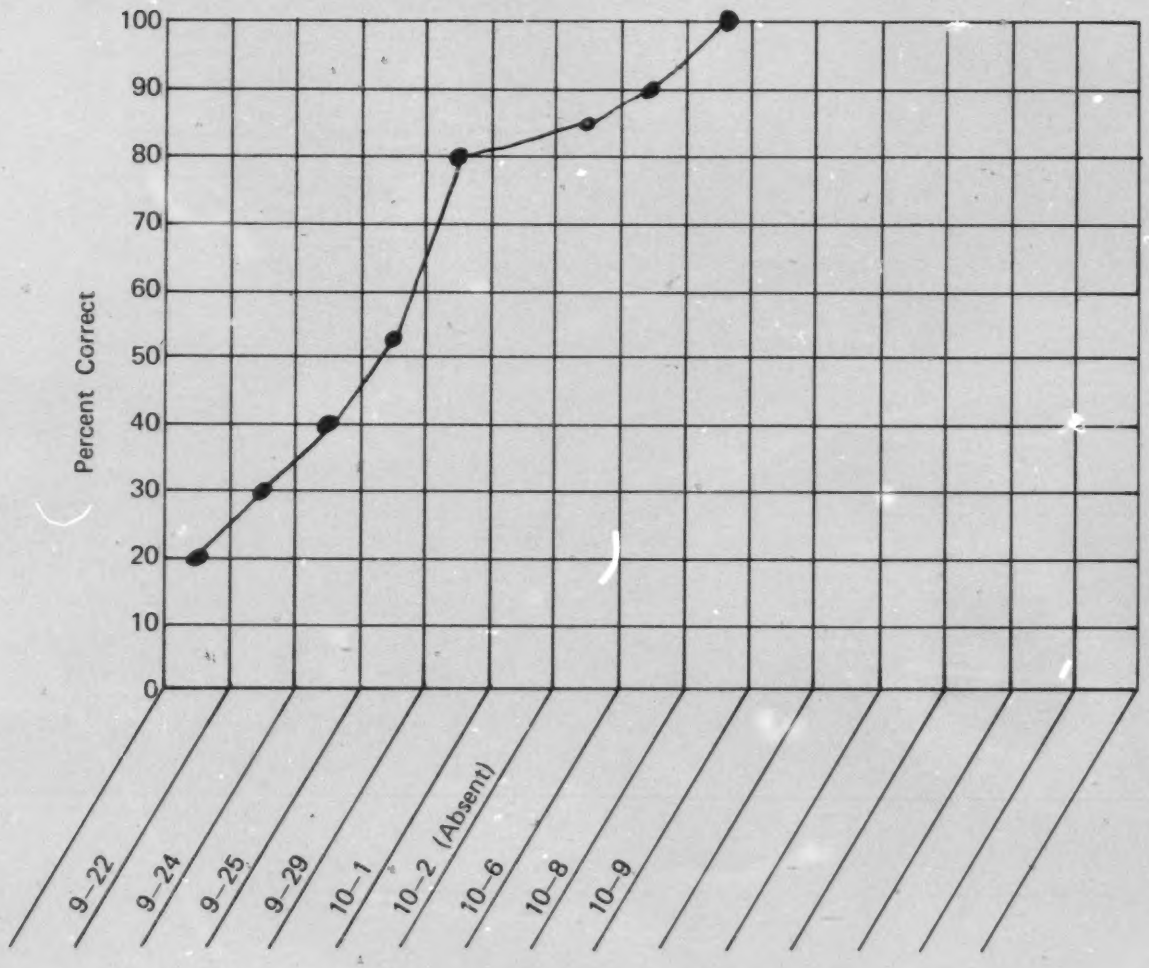
X=incorrect 0=correct reinforced Ø=correct not reinforced

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Correct No.	Correct %
9–22	X	X	X	X	0	X	X	X	X	X	0	X	X	0	X	X	X	0	X	X	4	20
9–24	X	X	X	X	X	0	X	0	X	X	0	X	X	X	0	X	X	0	X	0	6	30
9–25	0	X	X	0	0	X	X	X	0	X	0	0	X	0	X	X	X	0	X	X	8	40
9–29	X	X	0	0	0	0	0	X	X	X	0	X	0	X	0	0	0	0	X	X	11	51
10–1	0	Ø	0	Ø	0	Ø	0	Ø	0	Ø	X	0	Ø	0	X	Ø	X	0	X	Ø	16	80
10–2	A	B	S	E	N	T																
10–6	0	Ø	X	Ø	X	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	X	0	Ø	Ø	Ø	Ø	Ø	17	85
10–8	0	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	X	Ø	0	Ø	Ø	Ø	Ø	Ø	Ø	Ø	X	18	90
10–9	0	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	0	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	20	100

PROGRESS CHART

Name *Johnny Brown* Speech Clinician *Mary Jones*

Phoneme */tʃ/* School Year *1975–76*



Objective */tʃ/ in isolation* Objective _____ Objective _____

Completed *10/13* Completed _____ Completed _____

Reporting Progress

Parents, teachers and other specialists (when appropriate) should be informed of the pupil's progress through periodic conferences. In addition, progress reports should be prepared at least twice a year. Reports, in the essence of conserving time, should be brief but thorough. In accordance with procedural due process, all information transmitted to parents must be reported in the primary language of the home. Some parents will be able to comprehend sophisticated terminology, others will not. It may be necessary for reports to be worded even more simply than the following one.

Progress Report

Name *Johnny Brown* Age *11* Grade *5*

Reason for Speech therapy: Moderate to severe Articulation Problem

(Speech is difficult to understand)

Number of Therapy Sessions *9* Absences *1*

I. Work Done In Speech Therapy:

1. Teaching Johnny the correct way to make the "s" sound in isolation.

2. Teaching Johnny the correct way to make the "ch" sound in isolation.

II. Results: (Progress chart is attached)

1. Johnny is able to say the "s" sound correctly in isolation nineteen out of twenty times (95 percent of the time).

2. Johnny is able to say the "ch" sound correctly in isolation nineteen out of twenty times (95 percent of the time).

III. Recommendations:

Since Johnny is making excellent progress in therapy, as his chart shows, he will be continued in the speech therapy program. Next, Johnny will be working on saying the "s" and "ch" sound correctly in syllables.

Summary Reports

At the end of the year, a summary report should be prepared and submitted to appropriate persons (principal, coordinator of special services, coordinating clinicians, teachers, and parents).

Appendix A

SCREENING TESTS OF ARTICULATION

ARIZONA ARTICULATION PROFICIENCY SCALE (SURVEY FORM)

The Survey Form of the Arizona Articulation Proficiency Scale (AAPS) tests the most frequently misarticulated sounds including vowels, consonant blends and single consonant sounds in the initial and final positions. Norms are provided for each sound based on the age at which 90 percent of the children tested had acquired correct sound production. The test contains both picture and sentence stimulus material (Fudala, 1962).

FISHER-LOGEMANN TEST OF ARTICULATION COMPETENCE (SCREENING FORM)

The screening portion of the "Fisher-Logemann" includes the eleven most frequently misarticulated phonemes as identified by Hall (1938), Roe and Milisen (1942), and Sayler (1949). The screening test is a selected portion of the complete test and those phonemes included for screening are marked on the score sheet by a heavy dark line. Each of the picture cards used for screening is marked by a tab to facilitate the rapid location of the stimulus items (Fisher and Logemann, 1971).

GOLDMAN-FRISTOE TEST OF ARTICULATION

The *Goldman-Fristoe Test of Articulation* consists of three subtests:

1. *The Sounds-in-Words Subtest* tests phonemes in the initial, medial, and final positions and consonant clusters.

2. *The Sounds-in-Sentences Subtest* examines phonemes in connected speech as elicited by pictures depicting simple stories.

3. *The Stimulability Subtest* requires that the clinician stimulate the correct production in isolation of the phonemes occurring in error on the Sounds-in-words subtest.

The stimulus materials consist of large colorful pictures; the stimulus words are printed on the back of each card and the phonemes to be examined are color-coded and numbered consistently with the words on the score sheet, according to the position in which the

phoneme is being tested. The test appears best suited for preschool to middle school age children. A filmstrip version of the "Goldman-Fristoe" is available and is recommended for immature, distractible, or mentally retarded children (Goldman and Fristoe, 1969).

PHOTO ARTICULATION TEST

The *Photo Articulation Test* consists of the following stimulus items:

1. Seventy-two color photographs which are arranged with nine pictures on each of eight pages and which are designed to elicit one consonant or consonant blend in one position and one vowel or diphthong.

2. A deck of seventy-two individual color photographs for use with pupils who exhibit visual problems or who would have difficulty attending to more than one stimulus at a given time.

3. A supplementary word list to expand the analysis of phonemes in error, as indicated by the picture portion of the test, and to provide for stimulation of these sounds.

The test items are arranged in groups in order to obtain a separate score for each of the three categories of sounds described in this test as, (1) tongue sounds, (2) lip sounds and (3) vowel sounds. Two of the photographs are designed to elicit connected speech. For screening purposes, it is suggested in the test manual that only the photographs testing the sounds in the initial and final positions be administered. The manual indicates that the complete picture portion can be administered in approximately five minutes. Administration time for the entire test depends on the individual client (Pendergast, Dickey, Selmar and Sodar, 1969).

PREDICTIVE SCREENING TEST OF ARTICULATION

The *Predictive Screening Test of Articulation* (PSTA) is a screening instrument appropriate for identifying first graders with functional articulation disorders and for predicting which children will acquire normal articulation by third grade without speech therapy. The stimulus items are presented orally. The PSTA can be administered in five to seven minutes and consists of forty-seven items, divided into nine parts. The test includes the following components:

Part I. The stimulus words containing /r, s, l, and z/ in the initial position are presented; each item is presented three times in succession.

Part II. The stimulus words are single consonant sounds in various positions and each word is presented one time.

Part III. The items consist of two and three consonant clusters in the initial position.

Part IV. The stimulus item consists of a sentence.

Part V. The stimulus items are the phonemes /s/ and /e/ presented as isolated sounds.

Part VI. The stimulus items are syllable consonant/vowel combinations containing the consonants /s, z, p, t, and k/.

Part VII. The stimulus "la-la-la" is presented to assess tongue motility.

Part VIII. The stimulus item is presented and the child is required to discriminate between the correct and incorrect production.

Part IX. The stimulus is a clapping rhythm which the child is required to imitate (Van Riper and Erickson, 1969).

TEMPLIN-DARLEY 50–ITEM SCREENING TEST

The *Templin-Darley Screening Test* is designed to elicit the production of certain vowels, consonant blends and single consonant sounds in the initial and final positions. The test was standardized on the results of data from the assessment of articulation proficiency of pre-school and kindergarten children. Responses are elicited by the use of picture cards generally containing two to three stimulus items. For screening older children, appropriate selections may be made from the word and sentence lists included in the test. Cut-off scores have been determined to identify those pupils who require further testing (Templin and Darley, 1969).

Appendix B

TESTS FOR ASSESSING ARTICULATORY PROFICIENCY

A DEEP TEST OF ARTICULATION

A Deep Test of Articulation consists of a picture test and a sentence form. The picture test is constructed with two sets of cards mounted side-by-side so that each card can be turned individually. The cards located on the left side stimulate the production of consonant sounds in the final position, and the cards on the right stimulate the production of these sounds in the initial position. The cards are arranged so that various consonant-vowel combinations can be tested. The twenty-five consonants and ten vowels represented in the "Deep Test" allow for an in-depth assessment of articulation proficiency relative to phonetic context (McDonald, 1967).

ARIZONA ARTICULATION PROFICIENCY SCALE

The *Arizona Articulation Proficiency Scale* (AAPS) includes a picture test and a sentence test. The picture test consists of simple black line drawings of familiar objects; the sentence test is based on a third grade reading level. Vowel sounds, consonant clusters and single consonants in the initial, medial, and final positions are tested in developmental order in which they occur. The AAPS provides for pre-test/post-test measurement of the effectiveness of therapy and yields a numerical score. In the AAPS manual there are guidelines for a gross interpretation of the language skills of the subject (Fudala, 1970).

FISHER-LOGEMANN TEST OF ARTICULATION COMPETENCE

The *Fisher-Logemann Test of Articulation Competence* provides for two forms of testing:

1. The picture form which elicits spontaneous one-word responses.

2. The sentence form which is read orally by the pupil.

A portion of the picture test is designed for screening purposes as previously described. The picture and sentence form tests all phonemes of English. The colorful picture portion of the Fisher-Logemann is simplistic and appropriate for testing very young children and the mentally retarded, while the sentence form is appropriate for older children and adults.

The recording sheet for each form is organized to identify misarticulations according to distinctive features. The test manual provides instruction for interpretation of the subject's responses in terms of distinctive features and also provides information for interpretation of native and foreign dialects (Fisher and Logemann, 1971).

TEMPLIN-DARLEY TESTS OF ARTICULATION

The *Templin-Darley Tests of Articulation* (1969, page 2) consists of 141 items and includes the following units:

1. A 50-item Screening Test
2. A 42-item single consonant grouping in initial and final positions
3. A 43-item *Iowa Pressure Articulation Test*
4. A 31-item /r/ and /ɚ/ grouping of two and three phoneme clusters
5. An 18-item /l/ and /l/ grouping of two and three phoneme clusters
6. A 17-item /s/ grouping of two and three phoneme clusters
7. A 9-item miscellaneous grouping of consonants
8. An 11-item grouping of vowels
9. A 6-item grouping of dipthongs representing five dipthongs and one consonant-vowel combination

The "Templin–Darley" includes a picture and a sentence form; therefore, it can be used for children or older subjects. Normative data is provided according to age, sex, and socio-economic status. The test manual includes information relative to various aspects of articulatory testing (Templin and Darley, 1969).

APPENDIX C

TABLE 1

Developmental age at which consonant sounds are mastered by 90 percent of the children tested.*

Sound	Age	Position in Words
h	3	I
w	3	I
m	3	I & F
f	3	I & F
k	4	I & F
b	4	I & F
n	4	I & F
g	4	I & F
j (Y)	4	I
d	4	I & F
p	4	I & F
ŋ (NG)	5	F
t	5	I & F
l	6	I & F
l blend (pl)	6	I
l blend (ld)	6	F
dʒ (J)	6	I
v	6	I & F
r	7	I
r blend (tr)	7	I
r blend (gr)	7	I
ð (THis) (THat)	7	I
hw (WH)	8	I
tʃ (CH)	8	I & F
θ (THumb)	8	I
θ (mouTH)	8	F
ʃ (SHoe)	9	I
ʃ (fiSH)	9	F
z	9	I & F
s	11	I & F
s blend (st)	11	I & F
s blend (ts)	11	F
s blend (ks)	11	F

*Fudala (1970)

TABLE II

FREQUENCY OF OCCURRENCE OF PHONEMES

French, Carter and Koenig (1930)	Travis (1930)	Denes (1963)
/t	/t	/t
n	n	n
r	r	s
l	s	d
d	d	l
ð	l	m
s	m	ð
m	k	k
k	ð	r
w	w	w
z	h	z
j	z	b
f	f	v
h	b	p
v	v	f
p	g	h
b	j	j
g	p	ɔ
ɔ	ɔ	g
θ	ʃ	ʃ
ʃ	θ	θ
+ʃ	d_3	d_3
d_3	+ʃ	+ʃ
hw	hw	3/
3/	3/	

TABLE III

THE DIFFICULTY OF SOUNDS ACCORDING TO THE PERCENTAGE OF ERRORS MADE*

Sound	Percentage
z	45.8
m	40.0
θ	30.3
dʒ	30.2
d	25.0
s	19.9
g	18.5
ð	16.5
v	16.0
tʃ	14.0
b	6.7
t	6.4
r	5.9
k	4.7
ʃ	3.8
f	2.9
p	2.3
l	1.6
ŋ	1.1
w	.5
st	23.6
str	8.2
sk	7.2
dr	3.9
fl	2.9

TABLE IV

THE DIFFICULTY OF SOUNDS ACCORDING TO THE PERCENTAGE OF ERRORS AFTER ELIMINATING VOICELESS FOR VOICED SOUND ERRORS*

Sound	Percentage
θ	30.3
st	23.6
s	19.9
t	14.0
ð	13.2
z	12.4
str	8.2
sk	7.2
dʒ	7.2
tʃ	6.4
r	5.9
v	5.6
k	4.7
d	4.0
dr	3.9
ʃ	3.8
g	3.7
fl	2.9
f	2.9
p	2.3
l	1.6
b	1.4
ŋ	1.1
m	.5
w	.5

*Roe and Milisen (1942)

APPENDIX D

MATERIALS AND EQUIPMENT FOR DIAGNOSIS AND THERAPY OF ARTICULATORY DISORDERS*

(Available for loan through Learning Resource Center, 1406½ Gervais Street, Columbia, South Carolina)

Title	Source	Price	Description
The Best Speech Series (My Sound Book)	Stanwix	$ 1.25 each	These seven books are for use with all children in the years when language, especially consonant articulation, is being mastered.
Better Speech and Better Reading (Schoolfield)	Expression, 1951	4.00	Book
"Better Speech Can Be Fun" Booklets – R, S, Th, F, and L	Expression	.90 each	Five paper booklets for correction of these difficult sounds for use by the classroom teacher.
The Big Book of Sounds	Interstate	5.95	Collection of drill materials for all 25 of the major consonant sounds, professionally prepared for the therapists to use.
The Child's Book of Speech Sounds	Expression	1.50	This little book is written in enjoyable verse to be used by the child and to give added pleasure to his speech lessons.
Choral Speaking Arrangements for the Lower Grades (Abney)	Expression, 1937	2.00	Book
Choral Speaking Arrangements for the Upper Grades (Abney)	Expression, 1952	2.00	Book
Choral Speaking Arrangements for the Junior High (Abney)	Expression, 1959	2.25	Book

APPENDIX D (Continued)

Title	Source	Price	Description
The Clown Family Speech Book (Pollock)	Charles C. Thomas, 1960	6.50	Book
The First Steps in Speech Training (Bennett)	Expression, n.d.	1.00	Book
For Speech Sake (Jones)	Fearon, 1958	2.00	Book
Fun With Speech	Encyclopedia Britannica	6.45 12" record 9.75 2 10" records	This record contains exercises to eliminate speech defects; it is geared to a child's level of interest and provides fun with speech as he learns to speak correctly. By learning to identify individual sounds with a word, he develops phonic skills for good pronunciation.
Gallo ing Sounds (Ainsworth)	Expression, 1962	2.25	Book
Helping the Child to Listen and Talk (Sayre)	Interstate, 1966	.40	Book
Hide-and-Seek Activities Kit *Let's Play Hide-and-Seek*	Expression	6.00 with manual	It is bound with wire spiral binding to form an easel for convenience. Ten illustrations cover the practice sounds f, v, sh, th (voiceless), l, s, z, r, th (voiced), ch, j, with s and z. The manual contains 129 riddles in rhyme to accompany that number of little pictures which are located throughout the large illustrations in the easel.
Guess What!		1.00	There are 129 additional riddles and 129 pictures, utilizing the 11 practice sounds.
ID Cards	Speech and Language Materials	7.50	This is a set of colorful cards to aid in identifying sounds.

APPENDIX D (Continued)

Title	Source	Price	Description
Jack-in-the-Box	Expression	.90	The authors selected the most difficult sounds and motivated them through verses and pictures.
Listen and Learn Volume I	Pacific Records	10.00	These 4 records are for reading readiness and speech improvement. The s, r, th, and l sounds are emphasized.
Listen and Learn Volume II		7.50	These three records include sh, k, and g sounds.
The Listen-Hear Books	Follett	18.12	These books are to be used to help children with specific speech sounds that are often difficult to them.
Listen-Look-Say	Educators Publishing Service	3.85/t.m. .75/guide 3.20/pupil books	This is a speech improvement program for 1st or 2nd grade. It consists of three parts: Teacher's Manual, Seven Pupil Notebooks, and a Parent's Guidebook.
Listening and Speech Activities Through Music and Story Volume I	Pacific	5.95	This record includes warm, appealing stories and songs designed to involve children in activities for auditory discrimination.
Volume II	Pacific	5.95	This record has activities and movements combined with songs and stories.
My Speech Workbooks Books 1-3	Interstate	3.25	These workbooks are based on the successful application of five points: see it, say it, hear it, feel it, do it. These are workbooks, not textbooks. They are written to meet the needs of the child who needs help in addition to that which the trained speech therapist can provide.
Play and Say Set A – s, z, l, p Set B – f, v, r, k Set C – th, dzh, g, t Set D – ch, sh, d b	Stanwix		This is a clever activity intended to motivate speech development in children of all ages.
Play and Say It (Mellencamp)	Expression, 1959		Book

APPENDIX D (Continued)

Title	Source	Price	Description
Poems for Playtime (Rasmussen)	Expression, 1942		Book
Poetry Speaking for Children Part II (Gullon)	Expression, 1932		Book
Read the Picture Stories	Word Making Productions		This book contains stories for the practice of the s, r, d, t, l, dz, f, k, tg, g.
Something to Say All Through The Day (McClung)	Interstate, 1968		Book
Sound and Articulation Game	Expression		Game
Sound Identification Cards	Interstate		Through the use of these 12 colorful, durable cards, strong associations are built which will be of value in ear training and speech improvement.
Sounds for Little Folks (Stoddard)	Expression, 1940		Book
Sounds I Say Books I and II	Chronicle Guidance		Books
Sounds Like Fun (Parker)	Interstate, 1962	2.75	Book
Speech Aids for Elementary Grades (Fletcher)	Teachers Pub. Corp., 1965	3.25	Book
Speech Correction Through Listening (Bryngelson)	Scott, Foresman 1959	3.50	Book
Speech Corrections Through Story-telling Units (Nemoy)	Expression, 1954	4.00	Book
Speech Drills for Children in Form of Play (Barrows)	Expression, 1965	1.25	Book

APPENDIX D (Continued)

Title	Source	Price	Description
Speech Improvement Cards	Scott, Foresman	6.60	These accompany the language arts program, Curriculum Foundation Series. They aid the teacher with children who have poor articulation.
Speech Improvement Through Choral Speaking (Keppie)	Expression, 1942	3.50	Book
Speech Improvement Work and Practice Book	Expression	2.50	This is designed to help supply a shortage in drill and practice material for placing in the hands of pupils with the most common speech defects.
Speech Lotto	Carolina School Supply		There are six cards. Each has 3 initial, medial, and final letter pictures.
Speech Therapy Kit	Speech and Language Materials		This kit contains a mirror enclosed in a black vinyl case.
Speech Through Pictures	Expression		Book
Speech Ways (Scott)	Webster, 1955		Book
Speechcraft and Speechlore	Interstate		These are speech therapy workbooks.
Speech-O, A Phonetic Game	Expression		It provides motivational practice for school or home use to aid the child in carry-over of newly learned consonant sounds in controlled conversational activities.
Talking Time (Scott)	Webster, 1966		Book
Talking Time Series	Webster	49.00/set	These sixteen color filmstrips build speaking skills. Set I contains the p and b sounds, the t and d sounds, the m, n, and ng sounds, the f and v sounds, the wh, w, and h sounds. Set II includes the k and g sounds, the th sounds, the sh sounds, the ch and j sounds, the s and z sounds, the r sound, and the l sound.

APPENDIX D (Continued)

Title	Source	Price	Description
Toward Better Speech	Board of Education, New York City, 1963	1.00	Book
We Speak Through Music	Stanbow	7.95	This record and manual provide practice material to be used by the speech correctionist with the child who has articulatory disorders.
Articulation Therapy Unit I Building Basic Articulation Skills	Bell & Howell	175.00	Therapist designed program is compatible with all of the major approaches to articulation therapy.
Articulation Therapy Program – Drill Materials Unit	Bell & Howell	60.00	Program includes 6 books
Speech Improvement for the Trainable Retarded	Michigan State University		This book of activities and corresponding student activity book has been designed for use by the classroom trainable mentally retarded teacher. The lessons follow a definite plan and are short.
Goldman–Lynch Sounds and Symbols Development Kit	American Guidance	117.00	This program, designed for children 4½ – 9, is a complete program of activities and materials designed to stimulate production of the speech sounds and recognition of their associated symbols. The program is based on the concept that an awareness of speech sounds can best be developed in children through a combination of visual and auditory stimulation.
Peabody Articulation Cards	American Guidance	35.00	The cards are organized into the 27 consonant sound and blend categories.
Resource Aid of Speech and Language Materials for Development of Communicative Skills	New England SEIMC		This examines and classifies the diagnostic materials for speech and language development.

*These materials are listed in the *Annotated Materials Catalog* from the South Carolina Instructional Materials Center (Office of Programs for the Handicapped).

BIBLIOGRAPHY

Adler, S. "Dialectal differences: professional clinical implications." *J. Speech Hearing Dis.*, **36**, 90-100 (1971).

Ainsworth, S. *Speech Correction Methods.* Englewood Cliffs, N. J.: Prentice-Hall, 1948.

A. M. Book Company. *The SWRL Speech Articulation Kits.* For use in correcting a faulty "Th," substitution of "w" for "r," frontal and lateral lisp and omission of "L."

Amidon, H. F. "A statistical study of relationships among articulation errors made by one hundred first grade children." Master's thesis, University of Iowa, 1941. Cited by M. C. Templin and F. L. Darley, *The Templin-Darley Tests of Articulation.* (2nd ed.) Iowa City: University of Iowa, 1969.

Baker, R. D., and Ryan, B. P. *Monterey Articulation Program.* Monterey, California: Behavioral Sciences Institute, 1971.

Barker, J. O. "A numerical measure of articulation." *J. Speech Hearing Dis.*, **25**, 79-88 (1960).

Barnes, I. J., and Morris, H. L. "Inter-relationships among oral breath-pressure ratios and articulation skills for individuals with cleft palate." *J. Speech Hearing Res.*, **10**, 506-514 (1967).

Blanton, Ballard and Blanton (1916). Cited by V. Roe and R. Milisen, "The effect of maturation upon defective articulation in elementary grades." *J. Speech Dis.* 8, 37-50 (1942).

Bloomquist, B. L. "Diadochokinetic movements of nine-, ten-, and eleven-year-old children." *J. Speech Hearing Dis.*, **15**, 159-164 (1950).

Buck, M. W. "A study of the misarticulation of [r] in children from kindergarten through third grade." Master's thesis, State University of Iowa, 1948. Cited by E. T. MacDonald, *Articulation Testing and Treatment: A Sensory Motor Approach.* Pittsburg: Stanwix House, 1967.

Byrne, M. C. "Development and evaluation of a speech improvement program for kindergarten and first grade children." U.S.O.E. Cooperative Research Project No. 620 (8255), August 1962. Cited by W. Pronovost, *Speech and Hearing Services In Schools*, **1**, 14-23 (1969).

Carter, E., and Buck, M. "Prognostic testing for functional articulation disorders among children in first grade." *J. Speech Hearing Dis.*, **23**, 124-133 (1958).

Clark, B. J. "Using a short-term lisp correction program for more effective distribution of clinician's time." *LSHSS,* **5**, 152-155 (1974).

Coston, G. N. "A study of the effect of omissions and substitutions of selected consonants on intelligibility." Unpublished Doctoral Dissertation, University of Georgia, 1969.

Coston, G. N. "Contemporary treatment of cleft palate." Unpublished paper presented at South Carolina Speech and Hearing Association Convention, Spring 1975.

Coston, G. N.; Weiss, A. I.; and Easterling, L. "Efficacy of speech therapy for the mentally handicapped." *S. C. J. of Comm. Dis.*, **1**, 37-41 (Winter 1972).

Darley, F. L., ed. "Identification audiometry." *J. Speech Hearing Dis. Monograph,* No. 9 (1961).

Denes, P. B. "On the statistics of spoken English." *J. Acous. Soc. Am.*, **35**, 892-904 (1962).

Diedrich, W. M. "Procedures for counting and charting a target phoneme." LSHSS, **5**, 18-32 (1971).

Diehl, C., and Stinnett, L. "The efficiency of teacher referrals in a school speech testing program." *J. Speech Hearing Dis.*, **22**, 113-117 (1956).

Fairbanks, G., and Spriestersbach, D. C. "A study of minor organic deviations in functional disorders of articulation: rate of movement of oral structures." *J. Speech Hearing Dis.*, **XV**, 60-69 (1950). Cited by C. Van Riper and J. V. Irwin. *Voice and Articulation.* Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1958.

Fargo, G. A., Behrns, C.; and Nolen, P. *Behavior Modification in the Classroom.* Belmont, California: Wadsworth Publishing Co., 1970.

Farquahar, Mary S. "Prognostic value of imitative and auditory discrimination tests." *J. Speech Hearing Dis.*, **26**, 342-347 (1961).

Fisher, H. and Logemann, J. *The Fisher-Logemann Test of Articulation Competence.* Boston: Houghton – Mifflin, 1971.

French, N. R.; Carter, G. W.; and Koenig, W. "The words and sounds of telephone conversations." *Bell System Tech. Jour.*, **9**, 29-324 (1930).

Fudala, J. B. *Arizona Articulation Proficiency Scale.* Los Angeles, Calif.: Western Psychological Services, 1970.

Fymbo, L. H. "The relation of malocclusion of the teeth to defects of speech." *Archives of Speech,* **1**, 204-216 (1936). Cited by Johnson, W.; Darley, F.; and Spriestersbach, D. C. *Diagnostic Methods in Speech Pathology.* New York: Harper and Rowe, 1963.

Gardner, W. I. *Behavior Modification in Mental Retardation.* Chicago: Aldine – Atherton, Inc., 1971.

Goldman, R., and Fristoe, M. *Goldman-Fristoe Test of Articulation.* Circle Pines, Minn.: American Guidance Service, 1969.

Griffith, J., and Miner, L. E. "A phonetic approach to articulation therapy." Paper presented at Illinois Speech and Hearing Association Convention, Arlington Heights, Ill., March 31, 1973.

Hale, A. R. "A study of the misarticulation of [s] in children in kindergarten through third grade." Master's thesis, State University of Iowa, 1948. Cited by E. T. MacDonald. *Articulation Testing and Treatment: A Sensory-Motor Approach.* Pittsburg: Stanwix House, 1967.

Irwin, R. B.; West, J.; and Trombetta, M. "Effectiveness of speech therapy for second grade children with misarticulation: predictive factors." *Except. Child,* **32**, 471-482 (1966).

Jakobson, R.; Fant, G.; and Halle, M. *Preliminaries to Speech Analysis: The Distinctive Features and Their Correlates.* Cambridge, Mass.: MIT Press, 1965.

Johnson, K. *Elementary English.* February 1971. Cited by H. Smith, reprint of standard or nonstandard, *Ele. Eng.,* February 1973.

Johnson, W.; Darley, F.; and Spriesterbach, D. C. *Diagnostic Methods in Speech Pathology.* New York: Harper & Rowe, 1963.

Johnson, W.; Brown, S. F.; Curtis, J. F.; Edney, C. W.; Keaster, J. *Speech Handicapped School Children.* New York: Harper, 1956.

Jordan, E. D. "Articulation test measures and Listener ratings of articulation defectiveness." *J. Speech Hearing Res.,* **3**, 303-319 (1960).

Kisatsky, T. J. "The prognostic value of Carter-Buck tests in measuring articulation skills of selected kindergarten children. Cited by R. K. Sommers, S. Cox and C. West, Articulatory effectiveness, stimulability and children's performance on perceptual and memory tasks." *J. Speech Hearing Res.,* **15**, 579-589 (1972).

Leonard, L. B. "The nature of deviant articulation." *J. Speech Hearing Dis.,* **38**, 156-161 (1973).

Locke, J. L. "Questionable Assumption Underlying Articulation Research." *J. Speech Hearing Dis.,* **33**, 112-116 (1968).

Marquardt, T. P., and Saxman, J. H. "Language comprehension and auditory discrimination in articulation deficient kindergarten children." *J. Speech Hearing Res.,* **15**, 382-394 (1972).

McDonald, E. T. *A Deep Test of Articulation.* Pittsburgh: Stanwix House, 1964.

McDonald, E. T. *Articulation Testing and Treatment: A Sensory-Motor Approach.* Pittsburgh: Stanwix House, 1967.

McDonald, E. T. and Frick, J. V. "Some factors which influence the frequency and duration of treatment sessions." *J. Speech Hearing Dis.*, **22**, 724-728 (1951).

Milisen, R. "A rationale for articulation disorders." *J. Speech Hearing Dis., Monograph*, **4**, 6-17 (1954).

Mowrer, D. E.; Baker, R. L.; and Schutz, R. E. *Modification of the Frontal Lisp Programmed Articulation Kit.* Palos Verdes Estates, California: Educational-Psychological Research Associates, 1970.

Nelson, J. T. "A study of misarticulation of [s] in combination with selected vowels and consonants." Master's thesis, State University of Iowa, 1941. Cited in E. T. MacDonald, *Articulation Testing and Treatment: A Sensory-Motor Approach.* Pittsburgh: Stanwix House, 1967.

Pendergast, K.; Dickey, S.; Selmar, J.; and Soder, A. *Photo Articulation Test.* Danville, Illinois: Interstate Printers, 1969.

Perrin, E. H. "The rating of defective speech by trained and untrained observers." *J. Speech Hearing Dis.*, **19**, 48-51 (1954).

Planning, Development, Management, Evaluation, ASHA, Dept. of Health, Education and Welfare, Office of Education, Bureau of Education for the Handicapped, Division of Research. Grant No. OEG – 0 – 9 – 302169 – 4324 (607) P. L. 91-230 Title VI.

Pollack, E., and Rees W. "Disorders of articulation: Some clinical applications of distinctive feature theory." *J. Speech Hearing Dis.*, **37**, 351-461 (1972).

Powers, M. H. "A study of the consistency of articulation defects in cases of athetoid and spastic cerebral palsy." Master's thesis, University of Iowa, 1953. Cited by M. Templin and F. Darley, *The Templin-Darley Tests of Articulation.* (2nd ed.) Iowa City: University of Iowa, 1969.

Pronovost, W. "Case selection in the schools: articulatory disorders." *Speech and Hearing Services in Schools*, **1**, 17-23 (1969).

Ringel, R. L.; House, A. S.; Burk, K. W.; Dolinsky, J. P.; and Scott, C. M. "Some relations between orosensory discrimination and articulatory aspects of speech production." *J. Speech Hearing Dis.*, **35**, 3-11 (1970).

Riviere, M. *Rehabilitation Codes.* New York: Rehabilitation Codes, Inc., 1962. Cited by W. Pronovost, "Case selection in the schools: articulatory disorders." *Speech and Hearing Services in Schools,* **1**, 17-23 (1969).

Roe, V., and Milisen, R. "The effect of maturation upon defective articulation in elementary grades." *J. Speech Dis.,* **8**, 37-50 (1942).

Sayler, H. "The effect of maturation upon defective articulation in grades seven through twelve." *J. Speech Hearing Dis.,* **14**, 202-207 (1949).

Shriner, T. H.; Holloway, M. S.; and Daniloff, E. G. "The relation between articulatory defects and syntax in speech defective children." *J. Speech Hearing Res.,* **12**, 319-325 (1969).

Shuy, R. W. "Language problems of disadvantaged children." In J. V. Irwin and M. Marge, eds. *Principles of Childhood Language Disabilities.* New York: Meredith Cor., 1972.

Sloane, H. N., and MacAulay, B. D., eds. *Operant Procedures in Remedial Speech and Language Training.* Boston: Houghton-Mifflin, 1968.

Smith, H. "Standard or Nonstandard: Is there an answer?" *Elementary English* (reprint by Eric Clearing House on Reading and Communication Skills), pp. 225-233, February 1973.

Snow, K. "Articulation Proficiency in relation to certain dental abnormalities." *J. Speech Hearing Dis.,* **XXVI**, 209-212 (1961).

Snow, K., and Milisen, R. "The influence of oral versus pictorial presentation upon articulation testing results." *J. Speech Hearing Dis., Monograph,* **4**, 30-36 (1954a).

Snow, K., and Milisen, R. "Spontaneous improvement in articulation as related to differential responses to oral and picture articulation tests." *J. Speech Hearing Dis., Monograph,* **4**, 46-49 (1954b).

Sommers, R. K.; Cox, S.; and West, C. "Articulatory effectiveness: Stimulability and children's performance on perceptual and memory tasks." *J. Speech Hearing Res.,* **15**, 579-589 (1972).

Sommers, R. K.; Cockerille, C. E.; Paul, C. D.; Boswer, D. C.; Fitcher, G. E.; Fenton, A. K.; and Copetas, F. G. "Effects of speech therapy and speech improvement on articulation and reading." *J. Speech Hearing Dis.,* **26**, 27-38 (1961).

Sommers, R. K., Leiss, R. H., Fundrella, D., Manning, W., Johnson, Oerther, P., Sholly, R. and Siegel, M., Factors in the effectiveness of articulation therapy with educable retarded children. *J. Speech Hearing Res.,* **13**, 304-316 (1970).

Sommers, R. K.; Leiss, R. H.; Delp, M. A.; Gerber, A. J.; Fundrella, D.; Smith, R. M.; Revucky; Ellis, M. V.; and Haley, V. A. "Factors related to the effectiveness of articulation therapy for kindergarten, first and second grade children." *J. Speech Hearing Res.,* **10**, 428-437 (1967).

Sprague, A. L. "The relationship between selected measures of expressive language and motor skill in eight-year-old boys. Unpublished Ph.D. thesis, University of Iowa, 1961. Cited by W. Johnson, F. Darley and D. C. Spriestersbach, *Diagnostic Methods in Speech Pathology*. New York: Harper and Row, 1963.

Spriestersbach, D. C.; Darley, F. L.; and Rouse, V. "Articulation of a group of children with lips and palates." *J. Speech Hearing Dis.*, **21**, 436-445 (1956).

Spriestersbach, D. C., and Sherman, D. *Cleft Palate and Communication*. New York: Academic, 1968.

Steer, M. D., and Drexler, H. G. "Predicting later articulation ability from kindergarten tests." *J. Speech Hearing Dis.*, **25**, 391-397 (1960).

Stoia, L. "An investigation of improvement in articulation in a therapy group and non-therapy group of first grade children having functional articulatory speech disorders." Ed.D. dissertation, Columbia University, New York, 1961. Cited by R. K. Sommers, S. Cox, and C. West, "Articulatory effectiveness, stimulability and children's performance on perceptual and memory tasks." *J. Speech Hearing Res.*, **15**, 579-589 (1972).

Templin, M. C. "Certain Language Skills in Children." (Institute of Child Welfare Monograph Series, No. 26). Minneapolis: University of Minnesota Press, 1957. Cited by M. C. Templin and F. Darley, *The Templin-Darley Tests of Articulation*. (2nd ed.) Iowa City: University of Iowa, 1969.

Templin, M. and Darley, F. *The Templin-Darley Tests of Articulation*. (2nd ed.) Iowa City: University of Iowa, 1969.

Travis, T. E. *Speech Pathology*. New York: Appleton-Century Company, 1930.

Vandemark, A. A., and Mann, M. B. "Oral language skills of children with defective articulation." *J. Speech Hearing Res.*, **8**, 409-414 (1965).

Van Hattum, Rolland J. *Clinical Speech in the Schools* Springfield, Ill.: Charles C. Thomas, 1972.

Van Hattum, R. J. "Evaluating elementary school speech therapy: Preliminary findings and research needs." *Exceptional Child*, **25**, 411-414 (1959).

Van Hattum, R. J.; Page, J.; Baskerville, R. D.; Duguay, M.; Conway, L. S.; and Davis, T. R. "The speech improvement system (SIS) taped program for remediation of articulation problems in the schools." *LSHSS*, V, 91-97 (1974).

Van Riper, C., and Erickson, A "Predictive Screening Test of Articulation." *J. Speech Hearing Dis.*, **34**, 214-219 (1969).

Van Riper, C. *Speech Correction Principles and Methoc*. Englewood Cliffs, N. J.: Prentice-Hall, 1963.

Van Riper, C., and Irwin, J. V. *Voice and Articulation.* Englewood Cliffs, N. J.:Prentice-Hall, 1958.

Weber, J. L. "Patterning of deviant articulation behavior." *J. Speech Hearing Dis.*, **35**, 135-141 (1970).

Weston, A. J., and Irwin, J. V. "Use of paired stimuli in modification of articulation." *Percep. and Motor Skills*, **32**, 947-957 (1971).

Whitacre, J. D.; Luper, H. L.; and Pollio, H. R. "General language deficits in children with articulation problems." *Lang. Speech*, **13**, 231-239 (1970). Cited by T. Marquardt and J. Saxman, "Language comprehension and auditory discrimination in articulation deficient kindergarten children." *J. Speech Hearing Res.*, **15**, 382-394 (1972).

Wilson, B. A. "The development and evaluation of a speech improvement program for kindergarten children." *J. Speech Hearing Dis.*, **19**, 4-13 (1954).

Winitz, H. *Articulatory acquisition and behavior.* New York: Appleton-Century Crofts, 1969.

Wolfram, W. "An appraisal of ERIC documents on the manner and extent of nonstandard dialect divergence." *ED 034 991* (1969). Cited by H. Smith, reprint of "Standard or Nonstandard: Is there an answer?" *Ele. Eng.*, February 1973.

Wood, K. S. "Measurement of progress in the correction of articulatory speech defects." *J. Speech Dis.*, **XIV**, 171-174 (1949). Cited by C. Van Riper and J. V. Irwin, *Voice and Articulation.* Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1958.

Zehel, A.; Shelton, R.; Arndt, W. B.; Wright, V.; and Elbert, M. "Item context and /s/ phone articulation test results." *J. Speech Hearing Dis.*, **15**, 852-859 (1972).